SOPC00032

TENNESSEE DEPARTMENT OF AGRICULTURE

Water Resources Program

The following individual has submitted all required elements of an NMP/CNMP as required to obtain a CAFO permit. Their Nutrient Management Plan (or CNMP) has been reviewed and approved by this office.

Name of Owner/Operator: Randall Branham

Operation Name: Circle B. Farm

Address of Operation: 8293 Eureka Road Cleveland, TN 37312

Phone Number: (423) 364-6820 County: Bradley

Date application was initiated:

RECEIVED
JUL 30 2010

Date approval forwarded to TDEC:

AUG 05 2010

NMP/CNMP Approval Date:

THE APPROVAL SHALL NOT BE CONSTRUED AS CREATING APRESUMPTION OF CORRECT

AUG 05 2010

OPERATION OR AS WARRANTING THAT THE APPROVED FACILITIES WILL REACH THE DESIGNED GOALS

Date approval received by TDEC

RECEIVED
NOV 29 2010
Permit Section

TDA Reviewer's Name: Sam Marshall

TDA Reviewer's Signature: Sam Marshall August 5, 2010
Date

Ten ee Department of Environment and Cons tion,
Division of Water Pollution Control
401 Church Street, 6th Floor L & C Annex, Nashville, TN 37243
(615) 532-0625

CONCENTRATED ANIMAL FEEDING OPERATION (CAFO) STATE OPERATING PERMIT (SOP) APPLICATION

Type of permit you are requesting: ☐ SOPCD0000 (designed to discharge) ☐ SOPC00000 (no discharge) ☐ Unknown, please advise

Application type: ☐ New Permit ☐ Permit Reissuance ☐ Permit Modification

If this NOI is submitted for Permit Modification or Reissuance provide the existing permit tracking number: ____

OPERATION IDENTIFICATION

Operation Name: CIRCLE B FARM	County: BRADLEY
Operation Location/ Physical Address: 8293 EUREKA Rd, Cleveland TN. 37312	Latitude: 35.2825 N Longitude: 84.856 W
Name and distance to nearest receiving water(s): Unnamed Trib. to CANDIES Creek	
If any other State or Federal Water/Wastewater Permits have been obtained for this site, list those permit numbers:	

Animal Type: ☒ Poultry ☐ Swine ☐ Dairy ☐ Beef ☐ Other ____

Number of Animals: 92,000	Number of Barns: 4	Name of Integrator:

Type of Animal Waste Management: (check all that apply)
☒ Dry
☐ Liquid
☐ Liquid, Closed System (i.e. covered tank, under barn pit, etc.)

Attach the NMP ☐ NMP Attached	Attach the closure plan ☐ Closure Plan Attached	Attach a topographic map ☐ Map Attached

PERMITTEE IDENTIFICATION

Official Contact (applicant): RANDAL BRANHAM	Title or Position: Owner			
Mailing Address: 210 Kingdon Drive	City: Cleveland	State: TN	Zip: 37312	☐ Correspondence ☐ Invoice
Phone number(s): (423) 364-6820	E-mail:			
Optional Contact:	Title or Position:			
Address:	City:	State:	Zip:	☐ Correspondence ☐ Invoice
Phone number(s):	E-mail:			

APPLICATION CERTIFICATION AND SIGNATURE (must be signed in accordance with the requirements of Rule 1200-4-5-.05)

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name and title; print or type	Signature	Date
RANDAL BRANHAM		7-28-10

STATE USE ONLY

Received Date	Reviewer	EFO	T & E Aquatic Fauna	Tracking No.
	Impaired Receiving Stream	High Quality Water		NOC Date

RECEIVED
JUL 30 2010

Randy Brannam

Nutrient Management Plan Requirements

The following 9 items need to be submitted at the time the permit is applied for. Additional record-keeping items as outlined in the CAFO rules are also considered part of the nutrient management plan and must be kept on-site. More information on each item can be found in the CAFO rule (1200-4-5-.14).

☑ 1. **Two maps: (1.)** A map of your farm showing location of any animal barns/houses, compost bins, litter storage bins, manure lagoons/holding ponds, nearby roads, fields to which litter/manure will be applied, and non-application buffer areas around any bodies of water (streams, creeks, rivers, ponds, wells, sinkholes, springs, wetlands, etc.). A hand-drawn map is acceptable and even preferred. **(2.)** A topographic map of the farm (1:24000 scale, showing 1-mile radius from farm) showing property lines.

☑ 2. **Nutrient budget** – this is basically a balance sheet of all manure produced on the farm and all manure spread on the farm or removed from the farm. Application rates for all fields should be based on crop needs, realistic crop yield expectations, and actual manure analyses of nutrient content.

N/A 3. **Soil test results** for phosphorus and potassium for each application field. These must be taken at a minimum of every five years.

N/A 4. Results of **manure analysis** from within the past year. Annual manure testing is a requirement for all CAFOs. These results must be included with initial permit application if the farm is in operation. If the farm that is applying for the permit is new and not yet operating, then manure testing results need to be obtained once operation begins. At that point, the manure test results and revised application rates need to be submitted to TDA. Manure test results in subsequent years need to be kept as part of your record-keeping activities.

N/A 5. Results of the **Phosphorus Index** applied to each field that has a soil test P value of "High" or "Very High". In those situations, this tool will determine whether your application rates will be based on nitrogen or phosphorus.

☑ 6. Statement regarding method of **dead animal disposal**.

☑ 7. **Closure Plan** to be implemented in the event animal production ceases on the site.

These last two items are only required for medium-size CAFOs that manage **liquid manure**.

N/A 8. Documentation of **design of liquid waste handling system**. This should include, but is not limited to: volume for solids accumulation, design treatment volume, total design volume, the approximate number of days of storage capacity, pumping and routing of wastes, and any solid separation process. Ideally, this documentation would consist of the pertinent engineering drawings with accompanying descriptive narrative.

N/A 9. The construction, modification, repair, or installation of any portion of a CAFO liquid waste handling system (such as earthen holding pond, treatment lagoon, pit, sump or other earthen storage/containment structure) after April 13, 2006 must be preceded by a thorough **subsurface investigation**. This investigation will include a detailed soils investigation with special attention to the water table depth and seepage potential.

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*In addition to the items above, the following form(s) must accompany your application:

☑ ***Notice of Intent* form** must be submitted with all applications from Class II (Medium) CAFOs

OR

☐ **EPA Forms 1 and 2B** must be submitted with all applications from Class I (Large) CAFOs.

Randall Branham
210 King Den Drive, NW
Cleveland, TN 37312
July 27, 2010

Tennessee Department of Agriculture
Attention: Mr. Sam Marshall
Ellington Agriculture Center
P. O. Box 40627
Nashville, Tennessee 37204

Dear Mr. Marshall:

There has been no change in my poultry operation located on 8293 Eureka Road, Cleveland, TN. I am abiding by the provisions stated in my current Concentrated Nutrient Management Plan dated 8/30/2006.

I acknowledge your request for a litter analysis which will be forwarded to you upon receipt of the results. I understand the litter analysis is required however will not delay the immediate renewal of my permit.

Sincerely,

Randall Branham

Date Prepared: 8/29/2006

1. CNMP Signature Page

Owner/Operator

Owner/Operator: Randy Branham	Phone:423-478-0629
Address: 210 King Den Drive City: Cleveland, Tn. 37312	
Farm(s)#: 2375	Tract(s): 1892

The following people have assisted with the development of the CNMP and certify that their element meets all applicable NRCS standards.

Litter and Wastewater Handling and Storage

Signature:	Date:
Name:	
Title:	

Nutrient Management

Signature:	Date:
Name:	
Title:	

Certified Conservation Planner

As a Certified Conservation Planner, I certify that I have reviewed this plan for technical adequacy and that the elements of the CNMP are compatible, reasonable, and able to be implemented.	
Signature: Trent Cash	Date: 8/30/2006
Name: Trent Cash	
Title: Soil Conservationist	

Owner/ Operator

As the owner/operator, I certify that as the decision-maker, I have been involved in the planning process and agree that the items listed in each element are needed. I understand that I am responsible for keeping all necessary records associated with the implementation of this CNMP. It is my intent to implement this CNMP in a timely manner as described in the plan.	
Signature: Randy Branham	Date: 8-30-06

7-28-10

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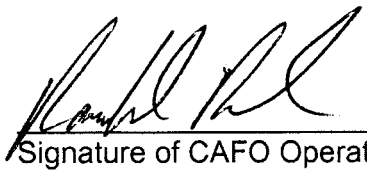
Addendum to Nutrient Management Plan:

By my signature below, I affirm that I have read, understand, and will comply with the following stipulations from Tennessee's CAFO rule (1200-4-5-.14) that apply to my CAFO operation.

1) All clean water (including rainfall) is diverted, as appropriate, from the production area.
2) All animals in confinement are prevented from coming in direct contact with waters of the state.
3) All chemicals and other contaminants handled on-site are not disposed of in any manure, litter, process wastewater, or storm water storage or treatment system unless specifically designed to treat such chemicals and other contaminants.
4) All sampling of soil and manure/litter is conducted according to protocols developed by UT Extension.
5) All records outlined in 1200-4-5-.14(16)d-f will be maintained and available on-site.
6) Any confinement buildings, waste/wastewater handling or treatment systems, lagoons, holding ponds, and any other agricultural waste containment/treatment structures constructed after April 13, 2006 are or will be located in accordance with NRCS Conservation Practice Standard 313.
7) Drystacks of manure or stockpiles of litter are always kept covered under roof or tarps.
8) An *Annual Report* will be written for my operation and submitted between January 1 and February 15 of each year. It will include all information required by rule [1200-4-5-.14(16)g].



Signature of CAFO Operator:

7-25-10

Date:

CLOSER PLAN

In the event this operator ceases to exist, the following will be done within 360 days:

- Any litter/compost currently in storage at the time of closure will be removed and spread on the farm or spread elsewhere according to my Nutrient Management Plan.
- All litter in houses will be removed and spread on the farm or spread elsewhere according to my Nutrient Management Plan.
- All land application of litter will be done at application rates calculated in the Nutrient Management Plan.
- The most current litter analysis will be provided to anyone removing litter from the farm.
- Any dead birds in the houses at the time of closure will be composted.

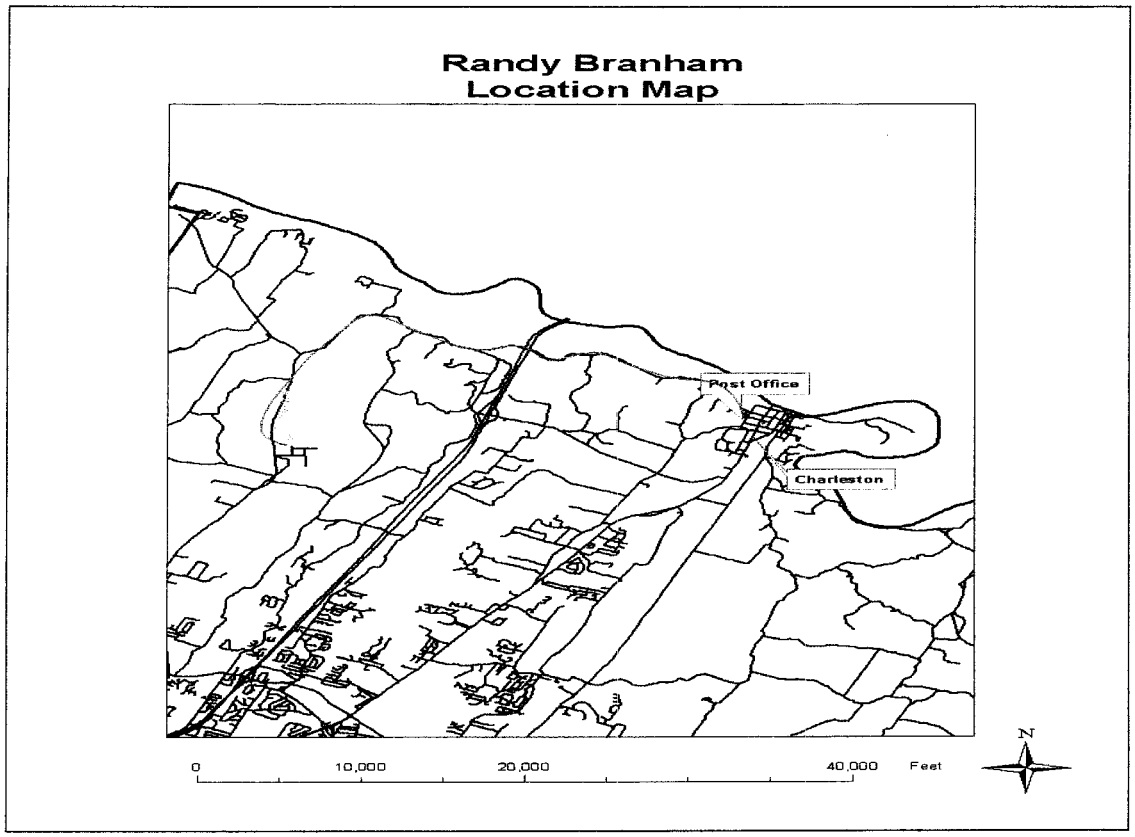
Randy Branham

7-28-10
Date

Comprehensive Nutrient Management Plan

Operation Name: Randy Branham Poultry
Owner Name: Randy Branham
Operation Address: 8293 Eureka Road NW
Cleveland, Tn 37310

Operation Telephone Number: (423) 478-0629 (Home)
Operator's Name: Randy Branham



Map 1: Highway Location Map

Driving Directions: From the Charleston Post Office. Turn West out of the parking lot onto Lower River Road and travel West for 3.2 miles. Lower River Road will then turn into Lauderdale Memorable Highway and travel SW on it for 2.1 miles. Then turn south onto Eureka Road and travel for 3.1 miles. Operation will be on the left hand side of the road and have a Pilgrim's Pride sign next to Eureka Road, chicken houses are approximately 200 yards from the road and very visible to a visitor.

Hydrologic Unit Code: 060200021403 Latitude: 35.2842 degrees North **Longitude -84.8650** degrees West, Prepared by: United States Department of Agriculture-Natural Resources Conservation Service Center Cleveland, TN
In Cooperation with the Bradley County Soil Conservation District

Date Prepared: 8/29/2006

1. CNMP Signature Page

Owner/Operator

Owner/Operator: Randy Branham	Phone:423-478-0629
Address: 210 King Den Drive City: Cleveland, Tn. 37312	
Farm(s)#: 2375	Tract(s): 1892

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Name:	
Title:	

Nutrient Management

Signature:	Date:
Name:	
Title:	

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Title: Soil Conservationist	

Owner/ Operator

As the owner/operator, I certify that as the decision-maker, I have been involved in the planning process and agree that the items listed in each element are needed. I understand that I am responsible for keeping all necessary records associated with the implementation of this CNMP. It is my intent to implement this CNMP in a timely manner as described in the plan.	
Signature: Randy Branham	Date: 8-30-06

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1.1. Introduction

This Comprehensive Nutrient Management Plan (CNMP) is a conservation system for your animal feeding operation. It is designed to address, at a minimum, the soil erosion and water quality concerns on your operation. This CNMP will also address the water quality concerns on the land. The described operation covered in this plan, owned and managed by Randy Branham, is an existing 4-house broiler operation. This operation will confine 92,000 broilers per growout, with a growout being every 8 weeks. This operation will not land apply the house litter. A portion of the litter generated from the operation will be placed in NRCS litter storage structures that are presently functional and was built in 1998 and 2001 on this farm and if any portion remains it will be stored under plastic cover according to NRCS standards and specs until removed by litter vendor. The following soil erosion and water quality concerns have been identified on your farm:

Table 1: Resource Concerns

Soil Erosion Concerns	Water Quality Concerns	Other Concerns Addressed
Sheet and Rill Erosion	Manure Runoff (From Facilities)	Aesthetics
		Maximize Nutrient Utilization
	Nutrients in Surface Water	Neighbor Relations
		Mortality Management and Emergency Action Planning

The primary concern of the operation that will be addressed in this plan is nutrient storage and transportation to 3rd party vendor and also odor control. In addition this plan shall address and give recommendations on land application of the litter generated at this operation. The litter will not be land applied at this operation. Recommendations will be made to the litter vendor(s) to whom land apply the litter generated at this operation. Guidance will be available to the litter vendor(s) from the operator(s) and NRCS, State, and Local agricultural personnel if needed. This plan will address for the operator litter storage, mortality management, emergency planning, and record keeping. In addition, this plan may be used by litter vendor(s) for guidance in litter storage, manure transfer, nutrient management, application logistics, application rates, equipment calibration, emergency planning, best management practices, and record keeping.

1.1.1. Confined Animal Feeding Operation (CAFO) Permit

Permit not available until plan is submitted.
For additional information on CAFO rules, refer to website
http://www.state.tn.us/sos/rules/1200/1200-04/1200-04-05.pdf.

2. Litter and Wastewater Handling and Storage

This element addresses the components and activities, existing and planned, associated with the production facility, litter storage and treatment structures and areas, and any area used to facilitate transfer of litter.

2.1. Current Litter and Wastewater Handling and Storage

The following sub-sections refer to the present situation existing on this operation.

2.1.1. Current and proposed animal numbers, sizes and locations

The proposed facility feeds 92,000 broiler type birds per growout. The four poultry houses located at this operation will measure 41'x 500'. The birds have an average weight of 3.2 lbs. The operation is housed on a parcel of property that borders the owner's residence and of the 31 acres roughly 5.0 acres will be covered by poultry houses/grass ground cover and the remaining acres are in perennial grass for hay usage and tree lines. Currently there are no other animals on the properties. The table below summarizes the poultry operation:

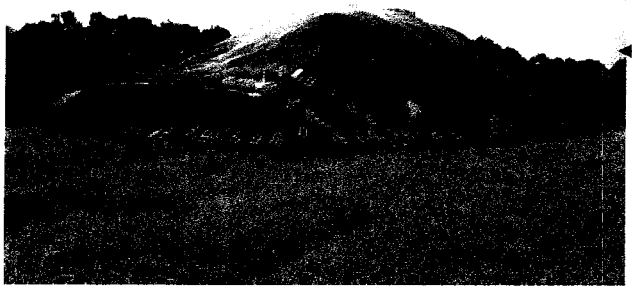
	Current	Proposed
Total Birds:	92,000	
Animal Type:	broiler	
Number of Birds (Per Structure):	23,000 42ftx500ft	
Number of Structures (Per Animal/Type)	4 houses	
Weight In	2 ounces	
Weight Out	6.4 lbs	
Average Weight:	3.2 lbs	
Time In Location:	8 wks. Per grow-out	
Number of Flocks (Per Year):	5	
Storage Structure Receiving Litter:	NRCS litter storage facility and composter	

2.1.2. Current Collection, Storage, Treatment and Transfer Methods

2.1.3. Collection and Storage

Houses are cleaned out after each growout, yielding an expected average of 631 tons of litter and 22 tons of composted birds per year. This volume of material is temporarily stored in 2-NRCS approved litter storage buildings that are 30'x40" with 8, 8' wide x 6' deep compost bins on the side. This volume of material will also be transported off-farm by a litter vendor(s) that are included in the record keeping portion of this plan. When custom operators are not available when houses need cleaning out, the operator will use its own farm tractor and 3 cubic yard CLUASE house keeper to remove the litter from the houses to move into the sheds. It will be a typical practice for all of the litter to be removed before fresh shavings (or appropriate bedding material) is added to the houses. Landowner adds PLT during some cleanouts to kill bacteria and aid in sanitary conditions and reduction of Phosphorus.

Temporary material can be stored outside by covering with plastic.



Example of a large covered waste field storage

2.1.4. Location of Litter Storage Area

Field storage of litter not needed for this farm, but included for third party information if needed, shall be located as close to the source as practicable. In addition, it shall be located in areas that will minimize potential risk for contamination of water bodies and considering prevailing winds and landscape elements such as landform and vegetation to minimize odors and visual resource problems. Layout of current facility can be seen on Farm Map on Page #9.

Field storage areas shall be located:

1. To minimize the potential for contamination of streams, waste storage facilities should be located outside of floodplains. However, if site restrictions require location within a floodplain, waste storage facilities shall be protected from inundation or damage from a 25-year, 24-hour storm event. Field storage of animal litter shall be located with respect to prevailing winds and landscape elements such as building arrangement, landforms, and vegetation, in order to minimize odors and protect aesthetic values.

2. Where year-round access to the manure storage will be practical during periods of wet weather.

3. Outside natural drainage ways.

4. A minimum of 150 feet from wells, springs, streams, and ponds, or 300 feet from a well when the well is located down gradient from the storage area.

5. A minimum of 300 feet from neighboring residences or public areas.

6. Near natural windbreaks, where possible, to protect the covering from blowing winds and aid in odor control.

2.1.5. Treatment

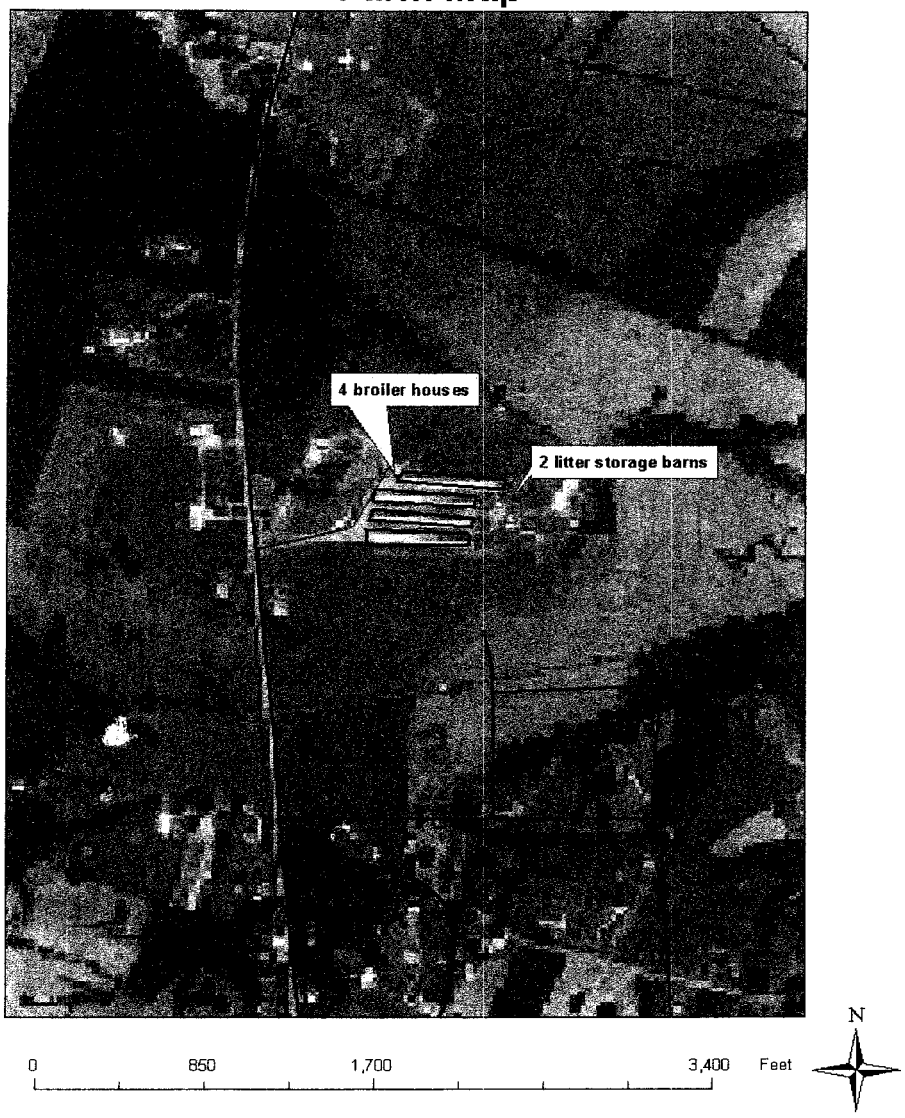
Currently granular PLT is being appied between growouts at this farm. Landowner plans to continue with practice as long as it's financially possible. Amendments are available that have positive effects on both production and the environment. These amendments can increase production of the birds by reducing ammonia emissions which can cause negative impacts to the health of the birds. In addition, available amendments can be beneficial by precipitating soluble phosphorus contained within the litter. This in return will decrease the land mass needed for land application of the litter.

2.1.6. Transfer Methods

Litter is proposed transported off the farm by 3rd party litter vendor(s). These vendors will typically use 3-ton trucks with a poultry litter spreader mounted. Litter will be loaded into the spreader truck from the storage site using a tractor with a front end loader, backhoe, or skid-steer loader. The litter loaded into the spreader will be covered before the spreader truck travels onto public roads. It is not necessary to cover the spreader if hauling from storage directly to a field located on the farm where no public roads will be traveled. The litter vendor will take the litter to an application field or pasture-dairy production or mushroom production facility where the litter shall be applied at agronomic crop removal rates or soil test recommendations **(a litter nutrient analysis will be provided to the litter vendor by the operator)**. If litter is not taken directly to an application site, the litter must be stored in an approved structure or if stored on the ground shall be covered following the before mentioned provisions.

Litter Truck Spreader

Randy Branham
Farm Map



Map 2: Farm Sketch with Animal Facilities

Randy Branham

Poultry System

Trent Cash

August 29, 2006

(This sheet generates nutrient values and volumes for poultry litter)

Poultry Type	Broiler (3.2 avg. weight)
Number of Birds	92,000
Method of Dead Bird Disposal	Composting
Mortality Rate	6.0 %
Flocks per Year	5.5 flocks per year
Pounds of Litter Produced/yr	1,214,400 lbs/yr
Volume of Litter Produced/yr	40,480 cu.ft./yr
Tons of Litter Produced/yr	607 tons/year
Tons of Litter sold or given away	631
Tons of Litter Needed for Composting	
a. Dead Birds Produced	49 tons/year
b. Litter Needed	121 tons/year
Tons of Compost to Spread	146 tons/year
Tons of Litter/Compost to Spread	631 tons/year
Method of Storage & Cleanout	decake
Nutrients Produced	46,099 lbs of N per yr
	58,097 lbs of P2O5 per yr
	49,888 lbs of K2O per yr
Nutrient Value of Litter/Compost	60 lbs of N per ton
	70 lbs of P2O5 per ton

	70 lbs of K2O per ton

(Version 10.0, July 2004)

2.1.7. Litter Composition and Testing

Litter shall be tested at least once per year for each storage facility. If no storage facility exists or is planned, then a representative sample from the poultry house shall be tested. The results of the most recent test, or an historical average value for the operation, shall be provided to litter haulers and vendors. The vendor(s) shall use these values to set their application rates.

2.1.8. Nutrient Content and Volume of Litter (If Transferred To Others)

All litter produced by this operation will be exported off the farm. Projected quantity and composition is in the table below.

Table 2: Litter Export Quantities and Nutrient Content

The following table is a prediction of the export event of the first year, and its values are used in Appendix B for calculating acreage needed to apply it at agronomic (N-based) rates. The litter nutrient values are book values. After the first year and first litter samples are tested, those values should be used in further assessment of acreage needed by litter haulers. Refer to Section 6 for record keeping forms and requirements. Nutrient contents are book values!!

759 tons/year

Export Date	Exported To	Quantity	Units	TKN	NH4-N	Org-N	NO3-N	P205	K20
11/1/2006	Third Party	631	Ton			60		70	70

2.2. Feed Management

Feed management activities may be used to reduce the nutrient content of litter, which may result in less land being required to effectively utilize the litter. Feed management activities may be dealt with as a planning consideration and not as a requirement that addresses specific criteria; however, AFO owners/operators are encouraged to incorporate feed management as part of their nutrient management strategy. Specific information and recommendations should be obtained from Land Grant Universities, industry, the Agricultural Research Service, or professional societies such as the Federation of Animal Science Societies (FASS) or American Registry of Professional Animal Scientists (ARPAS), or other technically qualified entities. Specific feed management activities to address nutrient reduction in litter may include phase feeding, amino acid supplemented low crude protein diets, and the use of low phytin phosphorus grain and enzymes, such as phytase or other additives. Feed management can be an effective approach to addressing excess nutrient production and should be encouraged; however, it is also recognized that feed management may not be a viable or acceptable alternative for all AFOs. A professional animal nutritionist should be consulted before making any recommendations associated with feed ration adjustment.

Any significant changes that would result in nutrient changes in the litter will require a re-evaluation of this plan (CNMP).

2.3. Mortality Disposal

This operation will use the existing 8 separate bins in the composter for normal mortality and burial according to below procedure for catastrophic mortality.

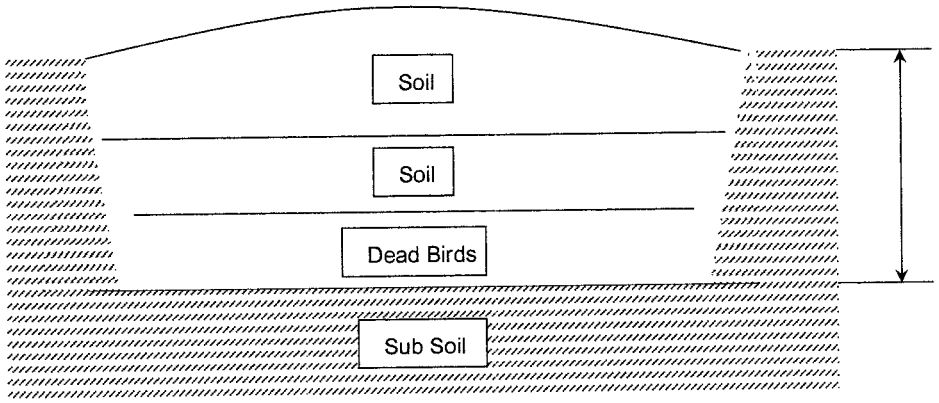
Records show that the mortality rate for an operation is projected to be around 6%. Annually this farm will need to compost around 25 tons of bird mortalities. At an average weight of 3.2 pounds, 49,000 pounds of dead birds will need composting. Fatalities will be removed daily and composted according to NRCS procedure.

Burial Procedure

Burial sites are to be dug an appropriate depth for the specific soil and geologic conditions. The maximum size of the burial excavation should be 0.4 acre (about 17,600 sq. ft.) dimensions are not definite; however, the area a single pit should not be greater than 1/10 of an acre. Multiple graves may be needed. For poultry place carcasses in a layer no thicker than one foot and cover each layer with at least one foot of mixed soil. For deep soils (where bedrock is not a concern), carcasses and soil can be placed in multiple layers up to a total depth of eight feet.

The burial site should be mounded with a covering of at least two feet of soil, and surface water should be diverted away from the mound. The site should be vegetated immediately after completion to prevent erosion of the soil covering. Appropriate safety measures should be used during excavation and material placement. Excavations over 3.5 feet deep should be sloped on the sides at least 1.5 (horizontal) to 1 (vertical).

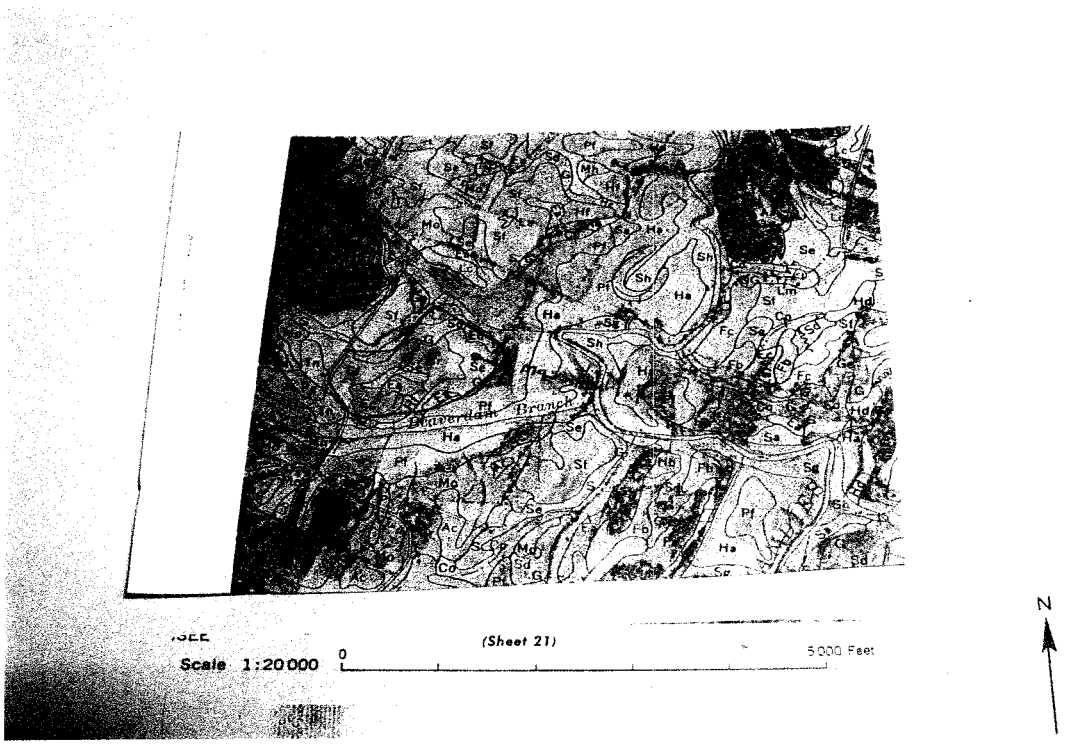
To handle a catastrophic loss of 70,000 birds, .1, 4 different acre burial pits will need to be excavated. Each pit is designed to hold around 17,000 dead birds. The pit shall be 4 feet deep. Two layers of birds shall be placed at the bottom of the pit and covered with at least 1 foot of mixed soil followed by two additional layers of birds covered by an additional 2 feet of soil or until 6 inches higher than natural ground level to allow for settling. If additional settling is observed after decomposition, additional top soil should be added to natural ground level. Disturbed areas and bare soil should be revegetated. The following catastrophic burial pit drawing illustrates how the pit should be constructed.



Catastrophic Burial Pit Drawing

2.4. Burning

Burning is the least desirable method for disposing of catastrophic loss. As a last alternative burning the bodies of dead animals, including poultry shall be done in accordance with TDEC Rule 1200-3-4-.04(f) and T.C.A. §§44-2-102(6), and where no other safe and/or practical disposal method exists.



Map 3: Soil Maps and Legend,

Ea-Emory Silt Loam, Ec- Etowah Silt Loam Eroded undulating phase, Ed- Etowah silt loam Undulating Phase, Ha- Holston Loam Eroded Undulating Phase, Sd- Sequoia silty clay severely eroded rolling phase Sf- Sequoia silty clay loam Eroded Undulating Phase

2.5. Emergency Action Plan

The emergency action plan will be implemented in the event that animal by-products from the operation are leaking, overflowing, running off site or are in imminent danger of doing so. The operator should not wait until litter reaches surface water or leaves the property to consider that there is a problem. This plan should be posted in an accessible location for all employees at the facility. The following are some action items you should take.

1. **Threatening Natural Occurrences**
   Prevent or minimize damage caused by threatening natural occurrences, such as tornadoes or strong storms associated with approaching fronts - actions include:

   a. Do not spread litter on fields prior to an approaching storm.
   b. Do not spread litter on fields that flood during high rainfall events.
   c. Notify State Veterinary Office - Animal Emergency Response Coordinator (See Table below) or Local Animal Emergency Response Coordinator for relocation of animals if needed.

2. **Personal injury**

   a. Stop all other activities to deal with the emergency.
   b. Call for help (See Table 3 below).

3. **Catastrophic deaths – Disease Related**
   a. Notify State Veterinary Office.
   b. Limit exposure to other birds.
   c. Prevent visitation by unnecessary people.
   d. Dead animals should be moved into an approved transport vehicle or an approved storage area or bin.
   e. Record date of catastrophic deaths, number of deaths, method and location of disposal.

4. **Catastrophic deaths – Disaster Related**
   a. Notify State Veterinary Office - Animal Emergency Response Coordinator immediately. (See Table 3 below)
   b. Notify the integrator, Perdue Farms or farm manager to remove useable animals.
   c. Remove mortality from the barns/houses.
   d. Dispose of mortality in the manner given in this CNMP for emergency dead animal disposal.
   e. Record date of catastrophic deaths, number of deaths, method and location of disposal.

5. **Litter Removal**
   a. Place litter in stacking structure if available. Do not stack old litter next to new or wet litter next to dry.
   b. Cover any litter stacks for temporary storage with plastic and weight down the edges. Cut a 4" diameter hole in the top and cover the hole with screen wire, see above picture.

6. **Fire**
   a. Stop all other activities to deal with the emergency.
   b. Try to extinguish the fire with the appropriately rated fire extinguishers.
   c. If fire cannot be contained, call for help (See Table 3 below.)

7. **Assess the extent of the spill and note any obvious damages.**

   a. Did the by-product reach any surface waters?

b. Approximately how much was released and for what duration?
c. Any damage noted, such as employee injury, fish kills, or property damage?
d. Did the spill leave the property?
e. Did the spill have the potential to reach surface waters?
f. Could a future rain event cause the spill to reach surface waters?
g. Are potable water wells in danger (either on or off of the property)?
h. How much reached surface waters?

8. **Provide the following information when reporting an emergency.**
    a. Your name and phone number.
    b. Directions to the farm.
    c. Description of emergency.
    d. Estimate of the amounts, area covered, and distance traveled.
    e. Has litter reached surface waters or major field drains?
    f. Is there any obvious damage: employee injury, fish kill, or property damage?
    g. What is currently in progress to contain situation?

9. **Implement procedures** as advised by TDEC and technical assistance agencies to rectify the damage, repair the system, and reassess the litter management plan to keep problems with release of litter from happening again.

10. **Documentation.** The following items shall be documented in writing and filed with the Emergency Action Plan for future reference and emergency response training.
    a. Date and time, location of spill, affected landowners.
    b. Affect of litter spill on any surface water body or potable water well.
    c. Approximately how much litter was released and for what duration.
    d. Amount of litter, if any that left the farm property.
    e. Any damage, such as personal injury, fish kills, property damage.
    f. Cause of the spill.
    g. Procedure to handle the emergency.
    h. Clean up efforts.
    i. List of authorities called those that responded, and the time it took for them to respond.
    j. Recommendations to prevent a reoccurrence

Table 3: Information and Important Phone Numbers for Emergency Response

Farm Information

Farm Name	Randy Branham
Address	210 King Den Drive Cleveland, Tn 37312
Farm Phone	423-478-0629
Permit #	
Directions to Farm	Driving Directions: From the Charleston Post Office. Turn West out of the parking lot onto Lower River Road and travel West for 3.2 miles. Lower River Road will then turn into Lauderdale Memorable Highway and travel SW on it for 2.1 miles. Then turn south onto Eureka Road and travel for 3.1 miles. Operation will be on the left hand side of the road and have a Pilgrim's Pride sign next to Eureka Road, chicken houses are approximately 200 yards from the road and very visible to a visitor.

Farm Contacts

	Name	Daytime Phone	Farm Phone	Cell Phone	Night Phone
Farm Owner	Randy Branham	423-478-0629			423-478-0629
Farm Manager	Randy Branham	"	"		"
Fire or Ambulance	**911**	**911**	**911**	**911**	**911**
Equipment: **Trackhoe** **Dozer**	Ricky Hall	423-284-1133		284-1133	

Agency Contacts

Contact Agency	Person	Day Phone	Emergency Number
TDEC	**Terry Whalen**	**1-888-891-8332**	**1-888-891-8332**
State Veterinarian	**Ronald Wilson**	**615-837-5120**	**615-837-5120**
Fire Department		**911**	**911**
Sheriffs Office	**Tim Gobble**	**931-473-8468**	**911**
NRCS	**Cleveland Field Office**	**423-472-5731 ext3**	
UT Extension	**County Office**	**423-476-4552**	
Integrator	**Pilgrims Pride**	**1-800-227-4709**	

3. Land Treatment Practices

This element addresses evaluation and implementation of appropriate conservation practices on sites proposed for land application of litter and organic by-products from an Animal Feeding Operation. On fields where litter and organic by-products are applied as beneficial nutrients, it is essential that runoff and soil erosion be minimized to allow for plant uptake of these nutrients.

Since no land application of litter is planned, there is no need for land treatment practices on this operation, except as necessary during construction to prevent erosion and sediment transport. Land treatment practices for litter vendor(s) will be covered later.

3.1. Land Treatment Practices and Expected Results

3.1.1. Land Treatment Practices

Plan for Establishing Vegetation
Vegetation establishment is required around the buildings and storage structures to reduce soil erosion.

All disturbed areas including slopes of pads will be planted to permanent vegetation. If construction is during seasons not suited for planting warm or cool season grasses, temporary vegetation will be established until the recommended planting dates. Refer to NRCS practice standard 342, Critical Area Treatment, for guidance.

4. Nutrient Management

Because no land applications are planned at this operation, the nutrient management section is unnecessary for this operation. Appendix D includes the Nutrient Management Practice Standard for the benefit of third party haulers who remove litter from this farm. Other practice standards can be located on the internet at http://www.nrcs.usda.gov/technical/efotg/

5. OPERATION AND MAINTENANCE

This section addresses the operation and maintenance of the litter management system, conservation practices, litter/compost testing, and equipment calibration.

Operation and maintenance of structural, non-structural, and land treatment measures requires effort and expenditures throughout the life of the practice to maintain safe conditions and assure proper functioning. Operation includes the administration, management, and performance of non-maintenance actions needed to keep a completed practice safe and functioning as planned. Maintenance includes work to prevent deterioration of practices, repairing damage, or replacement of the practice if one or more components fail.

Litter Spreader Calibration

There are several methods that can be used to calibrate the application rate of a manure spreader. It is desirable to repeat the calibration procedure 2 to 3 times and average the results to a more accurate calibration.

Before calibrating a manure spreader, the spreader settings such as splash plates should be adjusted so that the spread is uniform. Most spreaders tend to deposit more manure near the spreader than at the edge of the spread pattern. Overlapping can make the overall application more uniform. To get the effective spread with when overlapping requires measuring the width of two spreads and dividing by two.

Calibration should take place annually or whenever manure is being applied from a different source or consistency.

Land Application

a. Litter shall be applied by in compliance with the spreading rates listed in the tables.
b. If the crop, method of application, feed ration or consistency of manure changes, it will be necessary to re-calculate an appropriate application amount.
c. Litter and compost shall not be applied on saturated soil. Litter will not be spread in an established waterway or any defined drainage way that carries concentrated flow. Litter may be applied to newly constructed grass waterways if incorporated immediately. Litter should not be applied on land that is subject to flooding (5 percent chance or greater in one year).
d. Incorporating manure into the soil instead of surface application can reduce odors. Spreading on non-inversion weather days can reduce odors.
e. Avoid unnecessary contact with chemical fertilizers and organic byproducts. Wear protective clothing when working with plant nutrients. Extra caution should be taken when handling ammonia, sources of nutrients, or when dealing with organic wastes in stored or unventilated enclosures.
f. Sanitary precautions shall be taken in the collection, storage, transportation, and spreading of the litter. The body of all vehicles transporting manure on State or Federal roads shall be wholly enclosed, as to prevent spillage from occurring.
g. The litter utilization plan as given in this document shall be followed. This plan requires sampling and testing of litter and field soils before land application. Litter will be applied at the rates given in this plan or as adjusted when using current soil and litter analysis.
h. Litter application shall not be applied at rates that exceed the infiltration rates of the soil nor should they be applied at volumes greater than can be held in the root zone. These calculations are difficult, but if the liquid is ponding or standing then the application should stop immediately.

i. Litter shall be spread in accordance with the setback limits from surface waterways and groundwater as given in the Nutrient Management section of this plan or as otherwise stipulated by TDEC.

j. Litter must not be placed directly in or allowed to come into contact with groundwater. Animal byproducts shall not be applied to or discharged onto the land surface when the vertical separation between the ground surface and the water table is less than 1.5 feet. Certain areas of some fields will have high water tables during wet periods. Animal byproducts should not be spread on these areas during these periods.

k. Litter shall not be applied to land that is saturated from recent precipitation, flooded, frozen, or snow-covered. Litter shall not be applied during inclement weather. Animal by-products applied to a flood prone area should not be spread until the potential flooding season has passed.

l. To reduce odors:
   1. Animal by-products should be spread on days with little or no wind and the prevailing wind should be away from residences.
   2. By-products should be injected or incorporated soon after spreading.
   3. Proper setback distances from roads and residences should be observed when spreading animal by-products on utilization areas.
   4. Apply litter in the morning on sunny days.
   5. Apply litter on weekdays when neighbors have a higher probability of being away from home.
   6. Always contact close neighbors prior to spreading to avoid spoiling their outdoor activities.

m. Setback requirements for animal manure utilization areas:

n. See the Nutrient Allocation Schedule for allocation dates, application equipment used, and timing of incorporation.

Litter Sampling

Litter Sampling - Collecting the Sample

When collecting a litter sample from a storage facility, the most important thing to keep in mind is to **collect a sample representative of what will be land applied to the crop**. If a livestock operation has more than one storage facility (e.g. a holding pond and a dry stack) each unit should be sampled separately (e.g. the producer will need to collect two samples, one to represent each litter type, liquid sample and a solid sample).

Manure Sampling – Drystacks

The sample sent to the lab from a drystack should be a composite of several sub-samples. Sub-samples should be obtained from about 10 locations within the drystack. The sample locations should vary by depth (from 1 ft deep to 3 inches from the bottom) and by position (from the front, back and sides). After collecting the sub-samples, the material should be mixed in one container to make a homogeneous composite sample. The composite sample sent to the lab should be about one pint. It should be sent in a well-sealed container. Sealable plastic bags work well for relatively dry material, wide mouthed plastic bottles are better for wetter material.

Odor and Pathogen Management

It may not be practical or feasible to eliminate all odor emissions from the operation, but it is possible to manage or mitigate the odor. Some variables that effect odor are:

Type of operation	Building design
Ventilation method	Animal numbers
Animal diets	Manure treatment system

Season	Topography
Management skill or effort	

a. **Animal Cleanliness**
   b. Clean, dry, and healthy animals are less odorous. Dirty, manure-covered animals promote accelerated bacterial growth and the production of odorous gases.
   c. Animal stress can also be correlated to an increase in odor production. Ventilation and environmental controls for the buildings must be properly designed and maintained to keep the animals healthy.

d. **Minimize Dust**
   e. It has been established that there is a correlation between dust and odor emission. Dust particles adsorb and concentrate odorous compounds. As the dust particles are carried by the wind, so is the odor.
   f. Therefore, minimizing dust will reduce odor. Most farm dust comes from feed, fecal matter and, in the case of poultry, from feathers and litter. Dust also comes from animal skin, insects, and other sources.
   g. Buildings should be cleaned of all dust between batches of animals (including fans, shutters, and screens).

h. **Waste Storage Facility** - to reduce emissions of greenhouse gases, ammonia, volatile organic compounds, and odor:
   i. Consider alternatives and additional practices including covered anaerobic digesters (365), and composting facilities (317).
   j. Adjusting pH below 7 may reduce ammonia emissions from the waste storage facility but may increase odor when waste is surface applied.
   k. Consideration should also be given to the separation of the solids from the waste mixture. This will dilute the liquid waste product being treated in the lagoon and cause less odor. The solid separated material can be composted and sold or land applied.

l. **Animal diets** can also be manipulated to produce less waste and a less odorous waste.

m. **Proper Disposal of Mortality** - Normal mortality for the animal feeding operation *must* be properly handled for both odor control and biological security of the operation. Composting, incineration, and rendering are acceptable methods for mortality disposal.

n. **Good Fly and Rodent Control Programs** - These programs must be a continuous process on the farm. When feed and waste products are properly handled, these problems are minimized.

o. **Utilize Trees** - While trees should not grow directly adjacent to facilities, wind breaks of trees correctly positioned near the facility not only create a visual barrier but can also provide a large filtration surface for dust and odorous compound removal. Trees can adsorb odorous compounds and create turbulence that enhances odor dispersion and dilution. Trees also can create a cooler microclimate around the facility, which can reduce odors.

p. **Land application**
   q. Note wind direction and avoid spreading when the wind is blowing toward populated areas.
   r. Avoid spreading on weekend/holidays when people are likely to be engaged in nearby outdoor and recreational activities.
   s. Spread in the morning when air begins to warm and is rising, rather than in the afternoon.
   t. Use available weather information to best advantage. Turbulent breezes will dissipate and dilute odors. Hot and humid weather tends to concentrate and intensify odors, particularly in the absence of breezes. Rain will remove the odor from the atmosphere.
   u. Use natural vegetation barriers, such as woodlots or windbreaks, to help dissipate and filter odors.
   v. Establish vegetated air filters in field border area by planting conifers and shrubs as windbreaks and visual screens between cropland and residential developments.

Pathogen management

Many of the same conservation practices used to prevent nutrient movement from this animal feeding operation, such as runoff and erosion control are likely to minimize the movement of pathogens. Pathogenic organisms occur naturally in animal wastes. Exposure to some pathogens can cause illness to humans and animals, especially for immune-deficient populations.

Soil Testing

Soil testing should occur as recommended in Tables 4 and 5. Soil nutrient levels should be monitored by soil testing to determine the requirement or buildup of phosphorus and potassium in the soil. As a minimum, the soil test analysis is to include pH, phosphorus, and potassium.

Soil samples are to be collected in accordance with The University of Tennessee Extension Service guidance (UT PB 1061) or standard industry practice if accepted by The University of Tennessee.

Soil testing is to be performed by laboratories that are accepted in one or more of the following programs:

1. State Certified Programs
2. The North American Proficiency Testing Program (Soil Science Society of America)
3. Other laboratories whose test results and interpretations of such test are within the currently accepted guidelines of The University of Tennessee

Soil profile sampling for nitrogen, Pre-Sidedress Nitrogen Test (PSNT) (UT SP427 for corn), Pre-Plant Soil Nitrate (PPSN) or soil surface sampling for phosphorus or acidity may be necessary in situations where there are special production or environmental concerns.

Soil amendments shall be applied to adjust pH to specific range of the crop for optimum utilization of nutrients as per soil test recommendations.

Composting – Poultry

For proper composting, correct proportions of carbon, nitrogen, moisture, and oxygen need to be present in the mix. Common carbon sources are sawdust or wheat straw. It is desirable because of its bulking ability, which allows entry of oxygen. Other carbon sources that could be used are peanut hulls, cottonseed hulls, sawdust, leaves, etc. If lab testing of the litter or experience indicates that the carbon/nitrogen ratio is adequate (20 - 35:1 ratio), then litter alone should be sufficient for composting mortality as long as desirable bulking ability is achieved and moisture is properly managed. Moisture management is critical and must be maintained between 40 and 55 percent (40% -does not leave your hand moist when squeezed, 55% - if more than two drops drip from your hand the material is too moist).

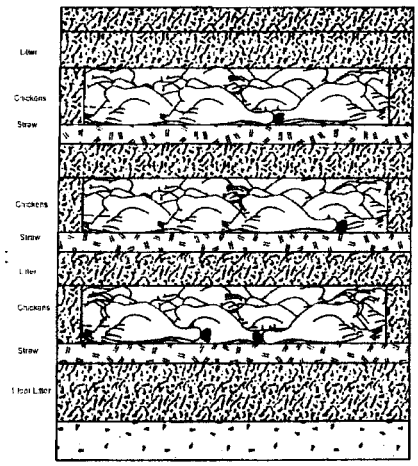
Recipe for composting broiler mortality

INGREDIENT	VOLUME	WEIGHTS
Straw	1.0	0.10
Carcasses	1.0	1.0
Litter	1.5	1.2
Water	0.5	0.75

Compost layering procedure

1. The first layer is one foot of litter.
2. A 4-6 inch layer of carbon amendment (sawdust is preferred) is added according to the recipe

3. A layer of carcasses is added. Carcasses shall be laid side-by-side and shall not be stacked on top of one another. Carcasses placed directly on dirt or concrete floors, or against bin walls will not compost properly.
4. Water is added (uniform spray).
5. Carcasses are covered with a 6-inch layer of litter.
6. Next layer of carcasses begins with carbon amendment and above steps repeated.
7. When composter is full, cap the 6-inch layer with four additional inches.



Maintain the moisture content at 40 to 55 percent during the composting process (40% - does not leave your hand moist when squeezed, 55% will allow about one drop of water to be released when squeezed, > 55% - if more than two drops drip from your hand the material is too moist, therefore add sawdust or dry carbon source).

Temperature is the primary indicator to determine if the composting process is working properly. A minimum temperature of 130 ° F shall be reached during the composting process. A temperature of 140 ° F is optimum; however, temperatures may range up to 160 ° F. If the minimum temperature is not reached, the resulting compost shall be incorporated immediately after land application or recomposted by turning and adding moisture as needed. Compost managed at the required temperatures will favor destruction of any pathogens and weed seeds.

Good carcass compost should heat up to the 140° range within a few days. Failure of the compost material to heat up properly normally results from two causes. First, the nitrogen source is inadequate (example wet or leached litter). A pound of commercial fertilizer spread over a carcass layer will usually solve this problem. Secondly, the compost fails when too much water has been added and the compost pile becomes anaerobic. An anaerobic compost bin is characterized by temperatures less than 120°, offensive odors, and black oozing compound flowing from the bottom of the compost bin. In this case a drier bulking / carbon amendment should be added to dry the mix. Then, the material should be remixed and composted.

It is possible, though unlikely, for the temperature to rise above the normal range and create conditions suitable for spontaneous combustion. If temperature rises above 170° F, the material should be removed from the bin and cooled, spread on the ground to a depth not to exceed six inches in an area away from buildings. Water should be added only if flames occur. If temperature falls significantly during the composting period and odors develop, or if material does not reach operating temperature, investigate piles for moisture content, porosity, and thoroughness of mixing.

After this first stage process, the material should be turned into a second bin and allowed to go through a second heat process. For larger birds, especially turkeys, a third turning may be necessary for complete degradation of the birds. Typically, the process can be considered "done" within 21-28 days from the time the compost is filled for broilers. For turkeys, the process usually requires about 60 days. After the heat process, curing period of one to three months is usually required before the material is stable.
Compost may be land applied after the secondary or tertiary composting. If any animal parts are still in the mix, the material must be incorporated. If immediate application is not possible the material should be stored using the same requirements as that of stored litter in the waste field storage specifications.

Inspect compost structure at least twice annually when the structure is empty. Replace any broken or badly worn parts or hardware. Patch concrete floors and curbs as necessary to assure water tightness. Examine roof structures for structural integrity and leaks. Inspections shall be documented on the attached worksheet.

The primary and secondary composters and the litter storage area should be protected from outside sources of water such as rain or surface runoff.

In order to assure desired operation of the composting facility, daily records should be kept during the first several compost batches. This can be helpful in identifying certain problems that may occur.

6. Record Keeping

It is important that records are kept to effectively document and demonstrate implementation activities associated with CNMPs. Documentation of management and implementation activities associated with a CNMP provides valuable benchmark information for the producer that can be used to adjust his/her CNMP to better meet production objectives. It is the responsibility of AFO owners/operators to maintain records that document the implementation of CNMPs.

The CNMP requires the producer to maintain these records for no less than 5 years. It is the producer's responsibility to ascertain the minimum time required for archiving the records listed below. In some cases, if certain USDA programs are in effect, the records may need to be kept as long as fifteen years.

Also, if the operation requires a permit, annual reporting may be necessary.

Records may be kept in a number of ways:

- Forms are available from the NRCS.
- Record forms may be obtained from University of Tennessee Extension Service (Publication 1644)
- You may develop your own records system provided that all necessary information is included.

"Closure Plan - if the facilities are no longer used for production or storage of litter, all litter shall be exported and dead birds buried according to this document and/or the NRCS 590 practice standard."

6.1. Documentation

The Table below shows which of the CNMP reports are required by NRCS to document plan implementation. As applicable, records include:

Table 13: Records to be maintained by Producer Farms

Item	Report Details	Frequency	Documentation	Tennessee Records Kept For:	Required by TDEC?
Monthly Animal and Mortality Count	Dates and numbers of dead collected and method of disposal.	Monthly	Suggested format included	5 years	Y
Litter Nutrient Analysis	A litter analysis must be completed annually, for each litter storage containment and prior to transport off the farm. It is essential that the rate of litter allocated be revisited each year using the current analysis data to make those decisions.	Annually	Suggested format included or Keep Test Reports	5 Years	Y
Transfer of litter offsite to third parties	a. Litter nutrient content b. Amount of litter transferred c. Date of transfer d. Recipient of litter	Event Driven	Suggested format included	5 Years	Y

Transfer of Litter off-site to Third Parties

Date	Litter Source	Quantity	Units of Quantity	NH4-N	Total N	P2O5	K20	Units of Analysis	Recipient Name Contact Details

[1] Units in ton, 1000 gal or ac-in. Note that 1 ac-in = 27,154 gal
[1] Units in lb/ton, lb/1000 gal or lb/ac-in. Note that 1 lb/ac-in = 27.154 lb/1000gal

Monthly Animal and Mortality Count

Animal/Type: Year:

Production Phase:

Month	Animal Count and Weight	Mortality	Mortality %	Comments
January				
February				
March				
April				
May				
June				
July				
August				
September				
October				
November				
December				

6.2. Litter Analysis Reports

Attach behind this page as they are completed (annually).

Litter Analysis Reports

1. Appendix B: Waivers and Agreements

Agreement for Removal of Litter, Manure and/or Process Wastewater from an AFO
(base on Appendix A of:, *TDEC Division of Water Pollution Control, Chapter 1200-4-5 Permit Effluent Limitations and Standards, July 2004*).

The conditions listed below help to protect water quality. These conditions apply to litter, manure and/or process wastewater removed from an AFO. The material covered by this ~~agreement was~~ removed on
Larry Bell from the facility owned by _____ located at
210 Kingsden Drive Cleveland TN 37312.

A. The litter, manure and/or process wastewater must be managed to ensure there is no discharge of litter, manure and/or process wastewater to surface or ground water.

B. When removed from the facility, litter, manure and/or process wastewater should be applied directly to the field or stockpiled and covered with plastic or stored in a building.

C. Litter, manure and/or process wastewater must not be stockpiled near streams, sinkholes or wells.

D. Fields receiving litter, manure and/or process wastewater should be soil tested at least every two or three years.

E. A litter, manure and/or process wastewater nutrient analysis should be used to determine application rates for various crops.

F. Calibrate spreading equipment and apply litter, manure and/or process wastewater uniformly.

G. Apply no more nitrogen than can be used by the crop.

H. A buffer zone is recommended between the application sites and adjacent streams, lakes, ponds, sinkholes and wells.

I. Do not apply litter, manure and/or process wastewater when the ground is frozen, or on steep slopes subject to flooding, erosion or rapid runoff.

J. Cover vehicles hauling litter, manure and/or process wastewater on public roads.

K. Keep records of locations where litter, manure and/or process wastewater will be used as a fertilizer.

I, Marc Wemer am the person receiving litter, manure and/or process
(name) wastewater and I understand the conditions listed above.

Marc Wemer 8-25-06
(signature) (date)

P.O. Box 246 423-338-2641
Delano TN. 37325
(address) (phone)

1. Appendix B: Waivers and Agreements

Agreement for Removal of Litter, Manure and/or Process Wastewater from an AFO
(base on Appendix A of:, *TDEC Division of Water Pollution Control, Chapter 1200-4-5 Permit Effluent Limitations and Standards, July 2004*).

The conditions listed below help to protect water quality. These conditions apply to litter, manure and/or process wastewater removed from an AFO. The material covered by this agreement was removed on

_____ from the facility owned by _____ located at
Ronald Bell 210 Kingston Drive Cleveland, TN. 37312

A. The litter, manure and/or process wastewater must be managed to ensure there is no discharge of litter, manure and/or process wastewater to surface or ground water.

B. When removed from the facility, litter, manure and/or process wastewater should be applied directly to the field or stockpiled and covered with plastic or stored in a building.

C. Litter, manure and/or process wastewater must not be stockpiled near streams, sinkholes or wells.

D. Fields receiving litter, manure and/or process wastewater should be soil tested at least every two or three years.

E. A litter, manure and/or process wastewater nutrient analysis should be used to determine application rates for various crops.

F. Calibrate spreading equipment and apply litter, manure and/or process wastewater uniformly.

G. Apply no more nitrogen than can be used by the crop.

H. A buffer zone is recommended between the application sites and adjacent streams, lakes, ponds, sinkholes and wells.

I. Do not apply litter, manure and/or process wastewater when the ground is frozen, or on steep slopes subject to flooding, erosion or rapid runoff.

J. Cover vehicles hauling litter, manure and/or process wastewater on public roads.

K. Keep records of locations where litter, manure and/or process wastewater will be used as a fertilizer.

I, James A. Beaty am the person receiving litter, manure and/or process
(name) wastewater and I understand the conditions listed above.

James A. Beaty 8/25/06
(signature) (date)

8293 Eureka Rd. 423-472-6607
Harrison TN 37310
(address) (phone)

1. Appendix B: Waivers and Agreements

Agreement for Removal of Litter, Manure and/or Process Wastewater from an AFO
(base on Appendix A of:, *TDEC Division of Water Pollution Control, Chapter 1200-4-5 Permit Effluent Limitations and Standards, July 2004*).

The conditions listed below help to protect water quality. These conditions apply to litter, manure and/or process wastewater removed from an AFO. The material covered by this agreement was removed on

[signature] from the facility owned by located at
210 Kingdom Drive Cleveland, Tn. 37312.

A. The litter, manure and/or process wastewater must be managed to ensure there is no discharge of litter, manure and/or process wastewater to surface or ground water.

B. When removed from the facility, litter, manure and/or process wastewater should be applied directly to the field or stockpiled and covered with plastic or stored in a building.

C. Litter, manure and/or process wastewater must not be stockpiled near streams, sinkholes or wells.

D. Fields receiving litter, manure and/or process wastewater should be soil tested at least every two or three years.

E. A litter, manure and/or process wastewater nutrient analysis should be used to determine application rates for various crops.

F. Calibrate spreading equipment and apply litter, manure and/or process wastewater uniformly.

G. Apply no more nitrogen than can be used by the crop.

H. A buffer zone is recommended between the application sites and adjacent streams, lakes, ponds, sinkholes and wells.

I. Do not apply litter, manure and/or process wastewater when the ground is frozen, or on steep slopes subject to flooding, erosion or rapid runoff.

J. Cover vehicles hauling litter, manure and/or process wastewater on public roads.

K. Keep records of locations where litter, manure and/or process wastewater will be used as a fertilizer.

I, David E. Rollins Jr. am the person receiving litter, manure and/or process
(name) wastewater and I understand the conditions listed above.

David E. Rollins Jr. 3-25-06
(signature) (date)

2102 White Oak Valley 423-476-3670
(address) (phone)

Appendix B: Land Requirements for Exported Litter

The values in the following report(s) should only be used as a guide for the producer and litter hauler. The 'Acreage Required' column in each report gives the acreage of each crop - at various yields - necessary to utilize all of the litter associated with that event. It is assumed that 50% of the nitrogen concentration given in the analysis is plant available and that the litter is applied at a nitrogen application rate.

Table 4: Suggested Nitrogen Rates and Timing Guidelines for Litter Use: Field and Forage Crops [1,2]

Export Date	Exported To	Quantity	Units	TKN	NH4-N	Org-N	NO3-N	P205	K20
11/1/2006	Third Party	631	Ton			60		70	70

Crop Type	Crop Name	Yield Level	Nitrogen Application Rate lbs/Acre	Application Time	Acreage Required [3]
Field Crops	Corn/Grain	100-125 bu.	120	at planting	55
		125-150 bu.	150	at planting	44
		150-175 bu.	180	at planting	32
		175-200 bu.	210	at planting	26
		200-225 bu.	240	at planting	23
	Corn/Silage	15-18 tons	120	at planting	55
		19-25 tons	150	at planting	50
		above 25 tons	180	at planting	45
	Small grain for grain	30-70 bu/acre	60	Feb. 15 - March 15	96
	Grain/Sorghum	50-100 bu/acre	90	at planting	81
	Canola/Rape		110	early to mid March before bolting	55
	Tobacco		200	at planting	260
Warm-Season Forages	Bermuda Establishment	Common or Hybrids	30	at planting	190
	Bermuda Maintenance	Common Pasture 1-2 tons/acre	60	May 1	96
		Common Pasture 3-6 tons/acre	180	May 1	26
		Hybrid Pasture 1-4 tons/acre	120	May 1	55
		Hybrid Pasture 5-6 tons/acre	180	May 1	27
		Hybrid Hay 1-6 tons/acre	120	May 1	55
		Hybrid Hay 7-12 tons/acre	400	Split total into 3 applications May 1, June 1, July 1	14
	Summer Annual Grass	Seeded before June 20	120	at planting	55
		Seeded after June 20	60	at planting	96
Cool-Season	Fescue Pasture	Establishment	30	at planting	190

		Maintenance spring pasture only (1-2 tons/acre)	45	March	248
		Maintenance spring hay and fall stockpile	105	split total application half in March and half in July	103
	Fescue Hay	Establishment	30	at planting	372
		Maintenance spring hay only (1-3 tons/acre)	105	March	103
		Maintenance spring hay and fall stockpile	165	split total application 2/3 in March and 1/3 in July	120
	Timothy or Orchard Grass Hay	1-3 tons/acre	120	March	92
	Small Grain and/or Ryegrass	Fall grazing	60	at planting	190
		Spring grazing	45	March 1	245
		Spring hay or silage	60	March 1	190

1/Producer must select the correct yield level based on a knowledge of yield potential for field soil type or field yield history from farm records.
2/Adapted from: P&SS Information Sheet #185, Lime and Fertilizer Recommendations for the Various Crops of Tennessee
3/This value considers all solid organic sources in the plan and their corresponding analysis. The annually available litter is then multiplied by the TKN in the analysis and factored by .5 to derive the acreage required per source. These derived acreages are then summed if the plan contains more than one solid organic nutrient source.

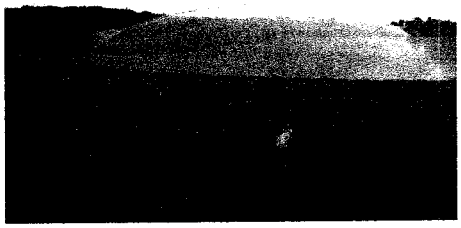
Appendix C: NRCS Code 590 Standard, Nutrient Management

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

NUTRIENT MANAGEMENT

(Acre)

CODE 590



DEFINITION

Managing the amount, source, placement, form, and timing of the application of nutrients and soil amendments.

PURPOSES

This practice may be applied as part of a conservation management system to support one or more of the following purposes:

- Budget and supply nutrients for plant production.
- Properly utilize manure or organic by-products as a plant nutrient source.
- Minimize agricultural non-point source pollution of surface and ground water resources.
- Maintain or improve the physical, chemical, and biological condition of soil.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to all lands where plant nutrients and soil amendments are applied.

Criteria

General Criteria Applicable to All Purposes

Plans for nutrient management shall comply with all applicable federal, state, and local laws and regulations.

Persons who review or approve plans for nutrient management shall be certified through any certification program acceptable to NRCS within the state.

Plans for nutrient management that are elements of a more comprehensive conservation plan shall recognize other requirements of the conservation plan and be compatible with its other requirements.

A nutrient budget for nitrogen, phosphorus, and potassium shall be developed that considers all potential sources of nutrients including, but not limited to, animal manure and organic by-products, waste water, commercial fertilizer, crop residues, legume credits, and irrigation water.

Realistic yield goals shall be established based on soil productivity information, historical yield data, climatic conditions, level of management, and/or local research on similar soil, cropping systems, and soil and manure/organic by-products tests. For new crops or varieties, industry yield recommendations may be used until documented yield information is available.

Plans for nutrient management shall specify the form, source, amount, timing, and method of application of nutrients on each field to achieve realistic production goals, while minimizing

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nitrogen and/or phosphorus movement to surface and/or ground waters.

Erosion, runoff, and water management controls shall be installed, as needed, on fields that receive nutrients.

Appropriate storage facilities shall be provided where nutrients have the potential to be exposed to the environment.

Soil Sampling and Laboratory Analysis (Testing)

Nutrient planning shall be based on current soil test results developed in accordance with University of Tennessee guidance or industry practice, if recognized by the University. Current soil tests are those that are no older than five years. Recommended soil testing frequency is contained in Table 4.

Table 4 - Recommended Soil Testing Frequency

Land Use	Frequency (Years)
Continuous Row Crops (Conventional)	2-3
Double-cropping System	2
Continuous No-till Corn, Cotton, Tobacco	1-2
Continuous No-till Soybeans (Only)	3-5
Hay Systems	2
Pasture	3-5
High Value Cash Crops (Tobacco, Vegetables)	Annually
Lawns, Gardens	3-5
Anytime a Nutrient Problem is Suspected	
At the Beginning of a Different Cropping Rotation	

Soil samples shall be collected and prepared according to Table 2 and University of Tennessee or standard industry practice. Soil test analyses shall be performed by laboratories accepted in one or more of the following programs:

- State Certified Programs.
- The North American Proficiency Testing Program (Soil Science Society of America).
- Other laboratories whose test results and interpretations of such tests are within the currently accepted guidelines of The University of Tennessee.

Soil testing shall include analysis for any nutrients for which specific information is needed to develop the nutrient plan. Request analyses pertinent to monitoring or amending the annual nutrient budget, e.g., pH, electrical conductivity (EC), soil organic matter, nitrogen, phosphorus, and potassium.

Table 5 - Soil Sampling Depths[1/]

Crop or Situation	Depth of Sample (inches)
Conventional or No-till Crops	6
Hay, Pasture, or Perennial Sod Crops	3
Pre-sidedress Nitrate-nitrogen	12

1/ Each subsample should include all of the soil in a profile approximately 1" x 1" to the listed depths. Refer to UT PB-1061 for additional information.

Plant Tissue Testing

Tissue sampling and testing, where used, shall be done in accordance with University of Tennessee (UT) standards or recommendations.

Nutrient Application Rates

Soil amendments shall be applied, as needed, to adjust soil pH to the specific range of the crop for optimum availability and utilization of nutrients.

Recommended nutrient application rates shall be based on UT's recommendations (Table 4 and/or industry practice when recognized by the University) that considers current soil test results, realistic yield goals, and management capabilities. Crop removal values for various crops are contained in Table 5 and can be used under certain conditions, as described in "Additional Criteria Applicable to Manure or Organic By-Products Applied as a Plant Nutrient Source."

The planned rates of nutrient application, as documented in the nutrient budget, shall be determined based on the following guidance:

- **Nitrogen Application** - Planned nitrogen application rates shall match the recommended rates as closely as possible, except when manure or other organic by-products are a source of nutrients. When manure or other organic by-products are a source of nutrients, see "Additional Criteria

Applicable to Manure or Organic By-Products Applied as a Plant Nutrient Source".

- **Phosphorus Application -** Planned phosphorus application rates shall match the recommended rates as closely as possible, except when manure or other organic by-products are a source of nutrients. When manure or other organic by-products are a source of nutrients, see "Additional Criteria Applicable to Manure or Organic By-Products Applied as a Plant Nutrient Source."

- **Potassium Application** - Excess potassium shall not be applied in situations in which it causes unacceptable nutrient imbalances in crops or forages. When forage quality is an issue associated with excess potassium application, follow UT's guidance for potassium application.

- **Other Plant Nutrients -** The planned rates of application of other nutrients shall be consistent with UT's guidance or industry practice, if recognized by UT.

- **Starter Fertilizers** - Starter fertilizers containing nitrogen, phosphorus and potassium may be applied in accordance with UT's recommendations or industry practice, if recognized by UT. When starter fertilizers are used, they shall be included in the nutrient budget.

Nutrient Application Timing

Timing and method of nutrient application shall correspond as closely as possible with plant nutrient uptake characteristics, while considering cropping system limitations, weather and climatic conditions, and field accessibility.

Nutrient Application Methods

Nutrients shall not be applied to frozen, snow-covered, or saturated soil, if the potential risk for runoff exists.

Nutrient applications associated with irrigation systems shall be applied in accordance with the requirements of Irrigation Water Management (Code 449). The application rate (inches/hour) for material applied through irrigation shall not exceed the soil intake/infiltration rate. The total application shall not exceed the field capacity of the soil.

Additional Criteria Applicable to Manure or Organic By-Products Applied as a Plant Nutrient Source

Nutrient Values. Nutrient values of manure and organic by-products (excluding sewage sludge) shall be determined prior to land application based on laboratory analysis, acceptable "book values" recognized by the NRCS and/or the University of Tennessee, or historic records for the operation, if they accurately estimate the nutrient content of the material. Book values recognized by NRCS may be found in Table 5.

Nutrient Budget. The determination to apply nutrients according to a nitrogen-based budget or a phosphorus-based budget will be as follows:

Step 1 – Preliminary Screening

- **Soil Test.** Nitrogen-based manure application rates can be used on fields where there is a soil test recommendation (within accepted guidelines of the University of Tennessee) to apply phosphorus. Phosphorus-based manure application rates will be used on fields where the soil test recommends no application of phosphorus, unless a "Medium" rating is obtained using the Phosphorus Index assessment tool.

Step 2 – P Index Assessment

- **Phosphorus Application.** When a recent soil test report indicates no need for phosphorus, a field-specific P Index assessment of the potential for phosphorus transport from the field shall be completed. In such cases, plans shall include:

  - A record of the assessment rating for each field or sub-field.

  - Information about conservation practices and management activities (i.e., Best Management Practices) as discussed with producer that plan to be implemented to reduce potential phosphorus movement from the site.

When the P Index indicates a Low or Medium risk potential for phosphorus to move off site, then a nitrogen-based application rate may be used. Where the P Index indicates a High or Very High risk potential for phosphorus to move off site, then a phosphorus-based application rate must be used.

Acceptable phosphorus-based manure application rates shall be determined as a function of soil test recommendation or estimated phosphorus removal in harvested plant biomass. Refer to Table 5 for phosphorus removed in the plant biomass.

A single application of phosphorus applied as manure may be made at a rate equal to the recommended phosphorus application or estimated phosphorus removal in harvested plant biomass for the crop rotation or multiple years in the crop sequence. When such applications are made, the application rate shall:

1. not exceed the recommended nitrogen application rate during the year of application

   or

   not exceed the estimated nitrogen removal in harvested plant biomass during the year of application when there is no recommended nitrogen application;

   and

2. Not be made on sites considered at High or Very High risk for phosphorus off-site transport, unless the risk can be reduced to Medium by implementation of appropriate conservation practices.

Nitrogen Application. When the plan is being implemented on a phosphorus budget, manure or other organic by-products shall be applied at rates consistent with the phosphorus budget. In such situations, an additional nitrogen application from non-organic sources may be required to supply the recommended amounts of nitrogen to achieve the planned production.

When application of commercial nitrogen is supplied to supplement the organic nitrogen using the phosphorus-based budget, nitrogen rates applied will not include luxury consumption values of the crop.

Manure and other organic by-products may be applied on legumes at rates equal to the estimated removal of nitrogen in harvested plant biomass.

Heavy Metals Monitoring

When sewage sludge is applied, the accumulation of potential pollutants (including arsenic, cadmium, copper, lead, mercury, selenium, and zinc) in the soil shall be monitored in accordance with the U.S. Code, Reference 40 CFR, Parts 403 and 503, and/or any applicable state and local laws or regulations. Table 9 contains maximum allowable yearly and cumulative application amounts.

Minimize Agricultural Non-point Source Pollution of Surface and Ground Water Resources

Non-application Buffers. Where unbalanced sources of nutrients are applied (i.e., manure, other organic sources of nutrients), non-application buffer zones shall be maintained or provided between the area receiving the nutrients and the area to be protected. The minimum non-application buffer widths and areas to be protected are contained in Table 3. In some cases, the establishment of a permanent vegetative buffer may be necessary to maintain a non-application buffer zone. Acceptable permanent vegetative buffers include, but are not limited to, NRCS conservation practice standards Filter Strip, Code 393; Riparian Forest Buffer, Code 391; Contour Buffer Strips, Code 332; Grassed Waterway, Code 412; Field Border, Code 386.

Additional Criteria to Improve the Physical, Chemical, and Biological Condition of the Soil

Nutrients shall be applied in such a manner as not to degrade the soil's structure, chemical properties, or biological condition. Use of nutrient sources with high salt content will be minimized unless provisions are used to leach salts below the crop root zone.

Nutrients shall not be applied to flooded or saturated soils when the potential for soil compaction and creation of ruts are high.

Table 6 - Non-Application Buffer Widths[1/]

Object, Site	Situation	Buffer Width *(ft.)* from Object, Site
Well	Located up-slope of application site	150
Well	Located down-slope of application site provided conditions warrant application	300
Waterbody[2/]	Predominate slope < 5% with good vegetation[3/]	30
Waterbody[2/]	Predominate slope 5-8% with good vegetation[3/]	50
Waterbody[2/]	Poor vegetative cover or Predominate slope > 8%[3/]	100
Public Road	Irrigated wastewater or solids applied with spreader truck	50
Dwelling	Other than Producer	300
Public Use Area	All	300
Property Line	Located downslope of application site	30

1/ Research has shown that forested or forest/grass buffers are more effective at removing nutrients and sediment than a grass buffer. Grass buffers are more effective at removing nitrogen. Every effort should be made to reduce phosphorus movement inputs at their sources.

2/ Waterbody includes pond, lake, stream, wetland, or sinkhole. "Open" sinkholes should be protected the same as a well. Where sinkholes are not "open", a buffer width should be established that provides optimum filtering above the depression. Stream includes both perennial and intermittent streams.

3/ Good vegetation refers to a well-managed, dense stand that is not overgrazed.

CONSIDERATIONS

Consider induced deficiencies of nutrients due to excessive levels of other nutrients.
Consider additional practices such as Conservation Cover (327), Grassed Waterway (412), Contour Buffer Strips (332), Filter Strips (393), Irrigation Water Management (449), Riparian Forest Buffer (391), Conservation Crop Rotation (328), Cover Crop (340), and Residue Management (329A, 329B, 329C, and 344) to improve soil nutrient and water storage, infiltration, aeration, tilth, diversity of soil organisms, and to protect or improve water quality.
Consider cover crops whenever possible to utilize and recycle residual nitrogen.

Consider application methods and timing that reduce the risk of nutrients being transported to ground and surface waters or into the atmosphere. Suggestions include:

- Split applications of nitrogen to provide nutrients at the times of maximum crop utilization.
- Avoid winter nutrient application for spring seeded crops.
- Band applications of phosphorus near the seed row.
- Apply nutrient materials uniformly to application areas or as prescribed by precision agricultural techniques.
- Immediate incorporation of land-applied manure or organic by-products.
- Delay field application of animal manure or other organic by-products, if precipitation capable of producing runoff and erosion is forecast within 24 hours of the time of the planned application.

Consider the potential problems from odors associated with the land application of animal manure, especially when applied near or upwind of residences.

Consider nitrogen volatilization losses associated with the land application of animal manure. Volatilization losses can become significant, if manure is not immediately incorporated into the soil after application.

Consider the potential to affect National Register listed or eligible cultural resources.

Consider using soil test information no older than one year when developing new plans,

particularly if animal manure is to be a nutrient source.

Consider annual reviews to determine if changes in the nutrient budget are desirable (or needed) for the next planned crop.

On sites on where there are special environmental concerns, consider other sampling techniques. [For example: Soil profile sampling for nitrogen, Pre-Sidedress Nitrogen Test (PSNT), Pre-Plant Soil Nitrate Test (PPSN), or soil surface sampling for phosphorus accumulation or pH changes.]

Consider ways to modify the chemistry of animal manure, including modification of the animal's diet to reduce the manure nutrient content to enhance the producer's ability to manage manure effectively.

PLANS AND SPECIFICATIONS

Plans and specifications shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose(s), using nutrients to achieve production goals and to prevent or minimize water quality impairment.

The following components shall be included in the nutrient management plan:

1. Aerial photograph or map and a soil map of the site.
2. Current and/or planned plant production sequence or crop rotation.
3. Results of soil, plant, water, manure, or organic by-product sample analyses.
4. Realistic yield goals for the crops in the rotation.
5. Quantification of all nutrient sources,
6. Recommended nutrient rates, timing, form, and method of application and incorporation.
7. Location of designated sensitive areas or resources and the associated nutrient management restriction.
8. Guidance for implementation, operation, maintenance, and recordkeeping.
9. Complete nutrient budget for nitrogen, phosphorus, and potassium for the rotation or crop sequence.

If increases in soil phosphorus levels are expected, plans shall document:

- The soil phosphorus levels at which it may be desirable to convert to phosphorus-based implementation.
- The relationship between soil phosphorus levels and potential for phosphorus transport from the field.
- The potential for soil phosphorus drawdown from the production and harvesting of crops.

When applicable, plans shall include other practices or management activities as determined by specific regulation, program requirements, or producer goals.

In addition to the requirements described above, plans for nutrient management shall also include:

- Discussion about the relationship between nitrogen and phosphorus transport and water quality impairment. The discussion about nitrogen should include information about nitrogen leaching into shallow ground water and potential health impacts. The discussion about phosphorus should include information about phosphorus accumulation in the soil, the increased potential for phosphorus transport in soluble form, and the types of water quality impairment that could result from phosphorus movement into surface water bodies.
- Discussion about how the plan is intended to prevent the nutrients (nitrogen and phosphorus) supplied for production purposes from contributing to water quality impairment.
- A statement that the plan was developed based on the requirements of the current standard and any applicable federal, state, or local regulations or policies; and that changes in any of these requirements may necessitate a revision of the plan.

OPERATION AND MAINTENANCE

The owner/client is responsible for safe operation and maintenance of this practice, including all equipment. Operation and maintenance addresses the following:

- Periodic plan review to determine if adjustments or modifications to the plan are needed. As a minimum, plans will be reviewed and revised with each soil test cycle.
- Protection of fertilizer and organic by-product storage facilities from weather and accidental leakage or spillage.
- Calibration of application equipment to ensure uniform distribution of material at planned rates.
- Documentation of the actual rate at which nutrients were applied. When the actual rates used differ from or exceed the recommended and planned rates, records will indicate the reasons for the differences.
- Maintaining records to document plan implementation. As applicable, records include:
  - Soil test results and recommendations for nutrient application.
  - Quantities, analyses, and sources of nutrients applied.
  - Dates and method of nutrient applications.
  - Crops planted, planting and harvesting dates, yields, and crop residues removed.
  - Results of water, plant, and organic by-product analyses.
  - Dates of review and person performing the review, and recommendations that resulted from the review.
- Records should be maintained for five years; or for a period longer than five years if required by other federal, state, or local ordinances, program, or contract requirements.
- Workers should be protected from and avoid unnecessary contact with chemical fertilizers and organic by-products. Protection should include the use of protective clothing when working with plant nutrients. Extra caution must be taken when handling ammonia sources of nutrients or when dealing with organic wastes stored in unventilated enclosures.
- The disposal of material generated by the cleaning nutrient application equipment should be accomplished properly. Excess material should be collected and stored or field applied in an appropriate manner. Excess material should not be applied on areas of high potential risk for runoff and leaching.
- The disposal or recycling of nutrient containers should be done according to state and local guidelines or regulations.

Table 7 - University of Tennessee's Standard Fertilizer Recommendations for Field Crops
Nitrogen, Phosphate, and Potash Recommendations Based on Soil Test
(Recommendations are given in pounds per acre of N, P_2O_5, and K_2O)

	Nitrogen Application		Phosphate Application When Soil Test Indicates:				Potash Application When Soil Test Indicates:			
	Planting or Seeding	Total N Top-dressed	Low	Med.	High	VH	Low	Med.	High	VH
Alfalfa										
Establishment	0-15	-	150	60	40	0	240	190	135	0
Maintenance[1]	-	0	80	60	40	0	240	190	135	0
Bermudagrass Establishment										
Common or Hybrids[2]	30	30	80	40	20	0	80	40	20	0
Bermudagrass Maintenance	-	60-180	60	40	20	0	120	80	40	0
Common Pasture[3]	-	120-180	60-90	40-60	20-30	0	120-180	80-120	40-60	0
Hybrid/Improved Pasture[3]	-	120-400	60-120	40-80	20-40	0	120-240	80-160	40-80	0
Hybrid/Improved Hay[4]										
Canola/Rape	30	110	30	0	0	0	30	0	0	0
Corn[5]										
For Grain										
100-125 bus.	120	-	100	50	25	0	100	50	25	0
125-150 bus.	150	-	120	60	30	0	120	60	30	0
150-175 bus.	180	-	140	70	35	0	140	70	35	0
175-200 bus.	210	-	160	80	40	0	160	80	40	0
200-225 bus.	240	-	180	90	45	0	180	90	45	0
For Silage										
15-18 tons	120	-	120	60	40	0	180	120	80	0
19-25 tons	150	-	160	80	60	0	240	160	100	0
> 25 tons	180	-	200	100	80	0	300	200	120	0
Cotton[6]	30-80	-	90	60	30	0	120	90	60	0
Grain Sorghum	60-90	-	60	30	20	0	60	30	20	0
Annual Lespedeza	0	-	40	20	0	0	40	20	0	0
Pasture, Hay or Silage										
Estab. or Renovation[7]	30	-	90	60	30	0	90	60	30	0
Maintenance[8]										
Pasture (Grass-Clover)[9]	-	0-30	60	30	0	0	60	30	0	0
Pasture (Grass)[10]	-	45-105	60	30	0	0	60	30	0	0
Hay (Grass-Clover)[11]	-	30-60	60	30	0	0	60	30	0	0
Hay (Grass)[12]	-	60-165	60	30	0	0	60	30	0	0
Timothy/Orchardgrass[13]	-	60-120	60	30	0	0	60	30	0	0
Sm. Gr./Ryegrass[14]	30-60	60-120	80	40	20	0	80	40	20	0
Sm. Gr./Ryegrass/Leg.[15]	15-30	30-90	80	40	20	0	80	40	20	0
Summer Annual Grasses[16]	60	0-60	60	30	30	0	90	60	30	0
Red Clover										
Establishment	0-15	-	90	60	30	0	90	60	30	
Maintenance	-	0	60	30	0	0	60	30	0	0
Sericea										
Establishment	0	-	60	20	0	0	60	20	0	0
Maintenance	-	0	40	20	0	0	40	20	0	0
Grain Sorghum Silage or Silage Sorghum Hybrids	90	-	120	60	40	0	180	120	80	0
Small Grain for Grain	15-30	30-60	80	40	0	0	40	20	0	0
Small Grain followed by Soybeans[17]	15-30	30-60	90	60	0	0	120	60	0	0
Soybeans[18]	0	-	40	20	0	0	80	40	0	0
Tobacco[19]										
Burley or Dark	150-200	-	150	90	60	0	300	180	120	0

Table 7. (Continued)

1/ Apply annually in late fall or winter after first production season. Apply 2 pounds boron per acre annually.
2/ For establishment of Bermuda grass, apply 30 pounds N at sprigging and 30 pounds one month later.
3/ On established stands, the rate of N topdressing depends of the need for forage. Apply one-half of the N May 1 and one-half July 1. If the higher rates of N are used, use the higher rates of phosphate and potash on the hybrid pastures.
4/ The rate of nitrogen top dressing depends on the need for forage. Apply 60 to 100 pounds of nitrogen May 1 and again after each cutting when conditions favor regrowth. Four cuttings are often possible. If the higher rates of N are used then use the higher rates of P and K when the soil test shows a need for P and K. P and K may all be applied in either the fall or spring in one application.
5/ Follow soil test recommendations when zinc is determined. In lieu of soil test use 5 pounds zinc (approx. 15 lbs. zinc sulfate) per acre when pH is 6.1 or above and phosphorus is high or anytime lime is applied in the following counties: Bedford, Cannon, Coffee, Cumberland, Davidson, DeKalb, Fentress, Franklin, Giles, Grundy, Jackson, Lincoln, Macon, Marshall, Maury, Moore, Morgan, Overton, Putnam, Robertson, Sumner, Trousdale, Warren, Williamson and Wilson. Five pounds zinc per acre should be applied anywhere deficiencies were observed the previous year.
6/ Use 30 to 60 pounds of nitrogen per acre on bottom soils and 60 to 80 pounds on upland soils. Use 1/2 lb. of boron per acre when the pH is above 6.0 or anywhere lime is used.
7/ If renovation involves the addition of legumes to grass pasture or hay, the nitrogen should be omitted.
8/ Apply phosphate and potash once each year. Apply nitrogen in fall and spring where additional growth is needed in the fall and spring. If growth is only needed during one season, apply nitrogen for that season only. For best growth, apply fall applications August 15 to September 15 and spring applications March 1 to March 30.
9/ The nitrogen should be omitted on pastures containing more than 30 percent clover in the spring, otherwise if clover is less than 30 percent of the pasture apply 30 lbs. of nitrogen per acre between March 1-30. For fall stockpiling of fescue apply 60 lbs. of N per acre August 15 to September 15 to all fescue-clover mixtures.
10/ Apply 45 lbs. of nitrogen August 25 to September 15 and from March 1 to March 30. If additional growth is only seeded during one season, apply nitrogen for that season only. Increase the fall rate to 60 lbs. of N per acre August 15 to September 15.
11/ Apply 30 lbs. of N per acre March 1-30 and again after the first cutting if an additional cutting is expected. For fall stockpiling of fescue apply 60 lbs. of N per acre August 15 to Sept. 15 to all fescue clover mixtures.
12/ Apply 60 lbs. of N per acre March 1-30. Where a second cutting is expected apply an additional 45 lbs. of N per acre immediately after the first cutting. If fescue is stockpiled in the fall, apply 60 lbs. of N per acre August 15 to Sept. 15.
13/ Where one cutting is made, apply 60 lbs. of N per acre March 15 to April 1. When more than one cutting is made, apply another 60 lbs. of N per acre immediately after the first cutting.
14/ For fall grazing apply 60 lbs. of nitrogen per acre at time of seeding. For fall and spring grazing, apply an additional 45 lbs. of N per acre about March 1 and 45 lbs. April 15. For fall grazing and spring hay or silage, apply 60 lbs. of N per acre at seeding and 60 lbs. N March 1-15. For spring hay or silage only, apply 45 lbs. N per acre at seeding and 60 lbs. March 15. Where ryegrass is in the mixture and an additional cutting is expected in the spring, apply an additional 60 lbs. of N per acre immediately after the first cutting. For spring grazing only, apply 30 lbs. of N per acre at seeding and 45 lbs. March 1 and 45 lbs. April 15.
15/ For fall grazing apply 30 lbs. of N per acre at time of seeding. For fall and spring grazing apply an additional 30 to 45 lbs. of N per acre about March 1 and again April 15. Use the 45-pound rate when the mixture contains less than 30 percent clover in the spring. For fall grazing and spring hay or silage apply 30 lbs. of N per acre at seeding and 30 to 45 lbs. N per acre March 1-15. For spring hay or silage only, apply 15 lbs. of N at seeding and 30 to 45 lbs. of N per acre March 1-15. Where ryegrass is in the mixture and an additional cutting is expected in the spring, apply an additional 30 to 45 lbs. of N per acre immediately after the first cutting. In each case, the 45 lbs. N rate is used instead of the 30 lbs. when the mixture contains less than 30 percent clover in the spring.
16/ Summer annual grasses included are sudangrass, pearlmillet, and forage sorghum hybrids. Apply 60 lbs. of N per acre at time of seeding. If pearlmillet and forage sorghum hybrids are seeded before June 20, apply an additional 60 lbs. of nitrogen per acre as topdressing after harvest in July. If urea is the nitrogen source for topdressing, some loss of nitrogen may occur if applied to moist soils followed by three or more days of rapidly drying conditions without rainfall. Apply only 30 lbs. of nitrogen per acre at seeding for soybeans and millet hay.
17/ Apply 15 to 30 lbs. N and the phosphate and potash at the seeding of wheat. Apply 30-60 lbs. of nitrogen on the wheat as a topdressing in the spring.
18/ Treat seed with 0.2 oz. molybdenum per bushel when soil pH is 6.5 or below. Apply either 1/2 oz. of sodium molybdate per bushel or follow the product label for hopper-box applied sources containing fungicides.
19/ Use only sulfate of potash for both burley and dark-fired tobacco.

The TENTATIVE RECOMMENDATIONS GIVEN ARE TO BE CONSIDERED AS GUIDES ONLY. Information on the cropping history, pasture fertilization, the turning under of green manure crops, the use of animal manures, etc., may indicate the need for a different fertilization program. The suggestions contained herein should give good to high yields depending on the management level.

Table 8 - Estimated Crop Nutrient Removal Values according to NRCS's Agricultural Waste Management Field Handbook, Chapter 6.

CROP	Quantity	N	P2O5	K2O
Grain crops (bushels)				
Barley	50	44	19	12
1 T. straw	1	15	5	30
Corn	100	90	36	27
	120	108	43	32
	140	126	50	38
	160	144	58	43
	180	162	65	48
	200	180	72	54
	220	198	79	59
	240	216	87	65
	260	234	94	70
	280	252	101	75
	300	270	108	81
Oats	80	50	20	15
	90	56	23	17
2 T. straw	2	25	15	80
Rye	30	35	10	10
	40	47	13	13
	50	58	17	16
	60	70	20	20
	70	82	23	23
	80	93	27	26
	90	105	30	30
1.5 T. straw	1.5	15	8	25
Sorghum	60	56	28	17
	70	65	32	20
	80	75	37	23
	90	84	42	25
	100	94	46	28
	110	103	51	31
3 T. stover	3	65	21	94
Wheat	40	50	34	15
	50	62	43	19
	60	75	51	22
	70	87	60	26
	80	100	68	30
	90	112	77	34
	100	125	86	37
	110	137	94	41
1.5 T. straw	1.5	20	5	35
Oil crops (bushels or lbs.)				
Rapeseed	35	63	32	16
3 T. straw	3	269	59	243
Soybeans	30	113	26	41
	40	150	35	55
	50	188	44	68
	60	225	53	82
	70	263	62	96
	80	300	71	109
	90	338	79	123
	100	375	88	137
Sunflower (lbs.)	1100	39	43	15
Fiber crops (lbs. of lint + lbs. of seed)				
Cotton (600 lbs. lint per ac.)	1600	43	21	16
Cotton (700 lbs. lint per ac.)	1867	50	25	19
Cotton (800 lbs. lint per ac.)	2133	57	28	21
Cotton (900 lbs. lint per ac.)	2400	64	32	24
Cotton (1000 lbs. lint per ac.)	2667	71	36	27

Forage crops (tons)				
Alfalfa	4	180	40	180
	4.5	203	46	202
	5	225	51	224
	5.5	248	56	247
	6	270	61	269
	6.5	293	66	292
Big bluestem	3	59	117	126
	3.5	69	137	147
	4	79	156	168
	4.5	89	176	189
	5	99	196	210
Birdsfoot trefoil	3	149	30	131
Bluegrass-pastd.	2	116	40	94
Bromegrass	5	187	48	306
Clover-grass	6	182	75	243
Dallisgrass	3	115	28	124
Bermudagrass	8	301	70	269
	9	338	79	302
	10	376	87	336
	11	414	96	370
Indiangrass	3	60	117	86
Lespedeza	3	140	29	76
Little bluestem	3	66	117	104
	3.5	77	137	122
	4	88	156	139
	4.5	99	176	157
	5	110	196	174
Orchardgrass	6	176	55	311
Red clover	2.5	100	25	100
Reed Canarygrass	6.5	176	54	56
Ryegrass	3	100	37	102
	3.5	117	43	119
	4	134	50	136
	4.5	150	56	153
	5	167	62	170
Switchgrass	3	69	14	137
Tall fescue	3	118	28	144
	3.5	138	32	168
	4	158	37	192
	4.5	177	41	216
	5	197	46	240
Timothy	2.5	60	25	95
Wheatgrass	1	28	12	64
Silage crops (tons)				
Alfalfa haylage (50% dm)	10	279	76	278
Corn silage (35% dm)	20	173	60	175
Forage sorghum (30% dm)	20	173	52	147
Oat haylage (40% dm)	10	128	52	90
Sorghum-sudan (50% dm)	10	136	37	174
Tobacco (lbs.)				
	2000	75	15	120
	2250	84	17	134
	2500	94	19	149
	2750	105	21	165
Turfgrasses (tons)				
Bluegrass	2	116	40	94
Bentgrass	2.5	155	47	133
Bermudagrass	4	150	35	134

Table 9 - Nutrient Availability of Animal Manures

Management System	Total Nutrients [1/] Pounds Per Ton					
	Incorporated[2/]			Surface Applied		
	N	P_2O_5	K_2O	N	P_2O_5	K_2O
FEEDER BEEF						
1. Fresh manure collected and applied daily	9	5	9	7	5	9
2. Manure collected daily, stored in covered tank, applied semi-annually	7	5	9	6	5	9
3. Bedded manure pack under roof, cleaned, and applied in spring (7.5% bedding)	5	4	8	4	4	8
4. Open lot manure pack, cleaned, and applied in spring	7	7	14	6	7	14
5. Manure collected and stockpiled outside from 4 to 6 weeks	7	9	10	6	9	10
DAIRY COWS						
1. Fresh manure collected and applied daily	7	3	6	6	3	6
2. Manure collected daily, 30% processing water added, stored in covered tank, and applied semi-annually	4	2	5	3	2	5
3. Bedded manure pack under roof, cleaned, and applied in spring (10% bedding)	4	3	6	3	3	6
4. Open lot manure pack, cleaned, and applied in spring	7	7	14	6	7	14
5. Manure collected and stockpiled outside from 4 to 6 weeks	7	9	10	6	9	10
POULTRY						
1. Broiler manure in sawdust or shavings cleaned yearly	50	54	36	40	54	36
2. Broiler manure in sawdust or shavings, cleaned yearly and temporarily stored	44	54	36	34	54	36
3. Table Egg Type, Hens & Replacements						
Undercage (fresh)	22	28	18	14	28	18
High Rise (stored)	27	50	27	18	50	27
5. Dead bird compost	39	38	32	27	38	32
SWINE						
1. Fresh manure collected and applied daily, no dilution	9	8	10	7	8	10
2. Manure collected in covered storage tank, diluted with 50% additional water, applied every 3 to 6 months	4	5	7	3	5	7
3. Manure collected in ventilated storage pit under slotted floor, diluted with 50 percent additional water, applied every 3 to 6 months	3	3	5	2	3	5
4. Open lot storage removed and applied in spring	6	11	14	5	11	14
	Total Nutrients[1/] Pounds/1,000 Gallons					
	Incorporated[2/]			Surface Applied		
LIQUID WASTE[1/]	N	P_2O_5	K_2O	N	P_2O_5	K_2O
1. Swine Lagoon (anaerobic), Surface Liquid only	3	2	4	2	2	4
2. Swine Lagoon (anaerobic), Sludge	25	52	77	20	52	77
3. Beef and Dairy Lagoon (anaerobic), Surface Liquid only	2	1	5	2	1	5
4. Poultry Lagoon (anaerobic), Surface Liquid only	6	2	11	5	2	11
5. Poultry Waste Storage Pond, Sludge Agitated	16	22	5	13	22	5

1/ After application losses and mineralization. It is highly preferred that plant-available nutrients be based on laboratory analysis.

2/ Nutrients available to crops where manure application occurs continuously (4 out of 5 years). To obtain the amount of plant-available nitrogen that is available for fields that rarely receive manure (1 out of 5 years), multiply number in Table 6 by 0.80. **When using results from lab test, multiply Total N by the appropriate factor in Table 7.**

Table 10 - Estimated Nitrogen Availability when using Results from Lab Analysis

	Incorporation within 2 days	Surface Applied
Fields that continuously receive manure applications (4 out of 5 years)	0.8	0.6
Fields that rarely receive manure applications (1 out of 5 years)	0.6	0.5

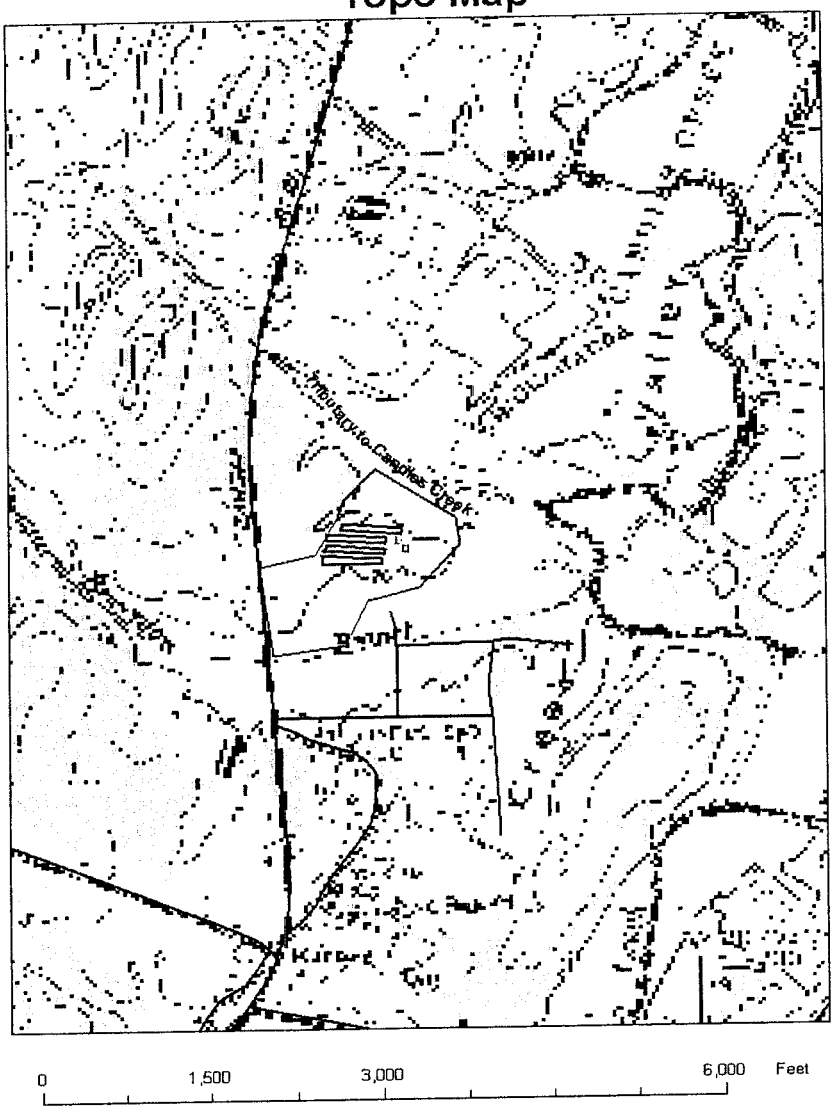
Table 11 - Estimated Nitrogen Availability to Succeeding Crops from Legumes

Crop	Description	Residual N (lbs./ac)
Alfalfa or Red Clover	Good stand (>4 tons/ac.) Fair stand (3 to 4 tons/ac.) Poor stand (< 3 tons/ac.)	90 70 50
Hairy Vetch	Good Fair Poor	100 75 50
Soybeans		1/2 lb. per bushel or 20 lbs./ac. if not known

Table 12 - Maximum Loading Rates Allowed by EPA for Heavy Metals on Agricultural Lanc

Metal	Maximum Site Application			
	cumulative total		yearly rate	
	lbs./ac.	*(kg/ha)*	*lbs./ac.*	*(kg/ha)*
Arsenic	37	(41)	2.2	(2.0)
Cadmium	34.8	(39)	1.7	(1.9)
Copper	1,340	(1,500)	67	(75)
Lead	268	(300)	13.4	(15)
Mercury	15.2	(17)	0.76	(0.85)
Nickel	375	(420)	18.75	(21)
Selenium	89.3	(100)	4.47	(5.0)
Zinc	2,500	(2,800)	125	(140)

Randy Branham
Topo Map



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